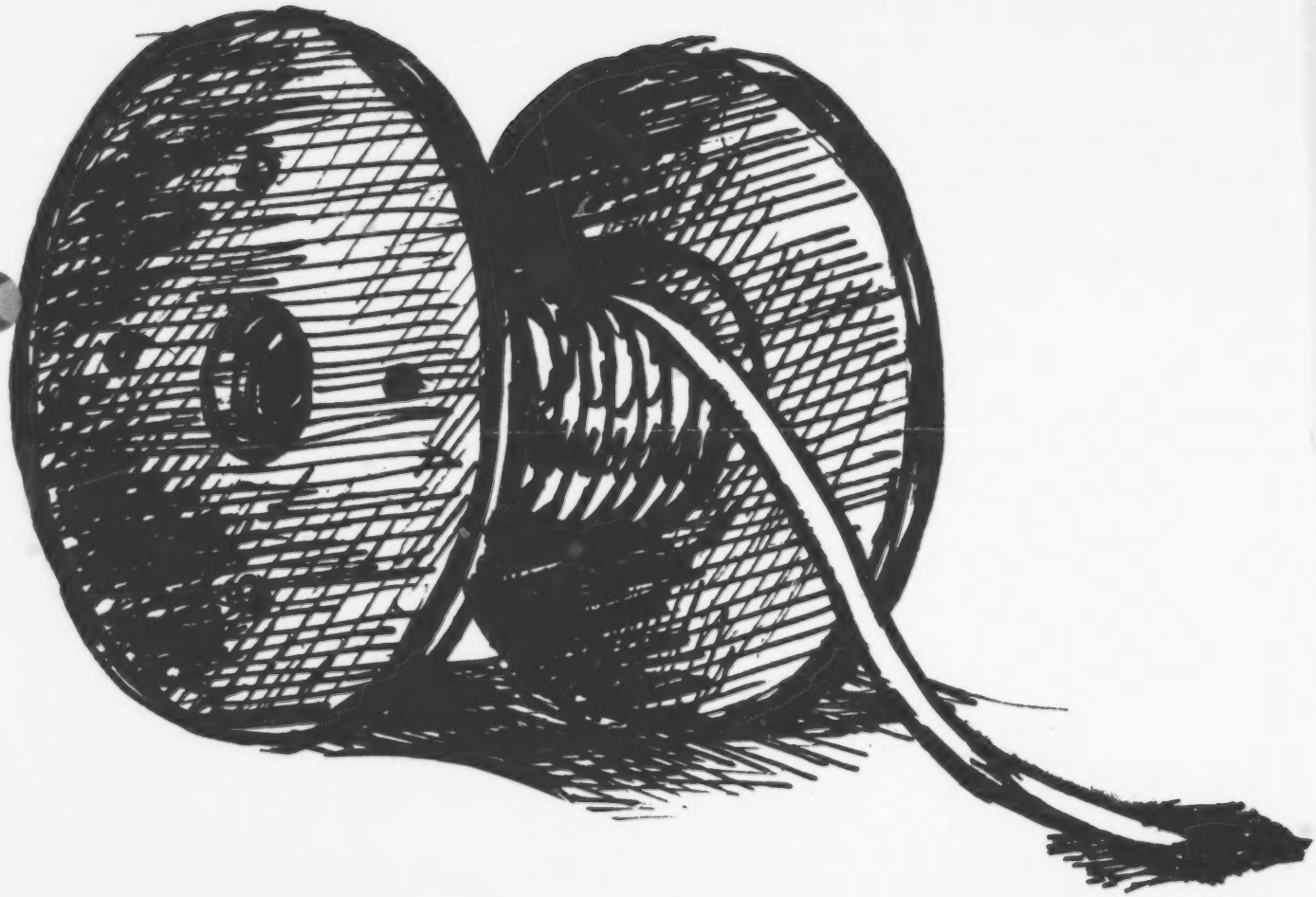
345-150

United States
Department of
Agriculture

Rural
Electrification
Administration

REA Bulletin 345-150
REA Form 515a

Specifications and Drawings for Construction of Direct Buried Plant



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United States Department of Agriculture
Rural Electrification Administration

May 25, 1989

REA Bulletin 345-150

SUBJECT: REA Specifications and Drawings for Construction of Direct Buried Plant, REA Form 515a.

I. Purpose: To announce the issuance of revised REA Form 515a, dated May 1989.

II. General: The REA specification for the construction of direct buried telephone plant has been revised to incorporate the following principal changes:

A. Addition of larger capacity buried plant pedestals and more optional accessory items for all sizes of pedestals.

B. Inclusion of an extra-large serving area interface cabinet and additional accessory options for all size cabinets.

C. Elimination of the BFCT, Trenched Filled Cable and Wire Assembly Unit. Provision for a suffix "T" to the BFC for identification of buried filled cable which will be placed at the specified depth by trenching only.

D. Inclusion of suffix "P" to the BFC unit for identification of predesignated buried filled cable that will be very difficult to bury.

E. Provision for suffix "HIC" to the BFC unit to indicate screened cable designated for TIC carrier systems.

F. Inclusion of assembly units for the direct burial of filled fiber optic cable.

G. Inclusion of an assembly unit for the splicing of fiber optic cables.

H. Provisions for the use of mini loading coils.

I. Provisions for designating diameter and length of rod, including use of suffix "S" to identify sectional ground rods related to housing ground assemblies.

J. Establishment of (a) a housing ground assembly unit, BM2B, for the installation of a bonding connector bracket within an existing housing and (b) an existing facility bonding unit, BM2C for bonding new cables in existing facilities.

K. Clarification of ripping unit, BM76, to include multiple passes, if necessary to achieve required depth.

L. Provisions for a suffix "O" to the HB unit to identify a buried splice closure for filled fiber optic cable, including the fiber organizer.

M. Clarification of the definition of the Cable Splicing Assembly Unit, HC.

N. Elimination of the use of a refraction seismograph in determining the soil composition for burying cable by plowing, ripping, and trenching.

Borrowers and borrower's consulting engineers are to use the revised specification on all plans and specifications for outside plant projects to be bid on or after July 1, 1989. This is not intended to restrict their use before July 1, 1989.

III. Availability of Specification:

A. Attached is a copy of revised REA Form 515a. REA material is not copyrighted and may be reproduced in quantities to meet your needs or additional copies may be obtained directly from the U.S. Government Printing Office (GPO), Superintendent of Documents, Washington, D.C. 20402.

B. Questions concerning the revision may be referred to the Chief, Outside Plant Branch, Telecommunications Staff Division, United States Department of Agriculture, Rural Electrification Administration, Washington, D.C. 20250, Telephone (202) 382-8667.

Jack Van Mark

Acting
Administrator

Attachment:
REA Form 515a

Index:
SPECIFICATIONS:
Direct Buried Plant Construction

Part I - DESCRIPTION OF ASSEMBLY UNITS AND PROPOSAL AND CONTRACT SECTIONS

The Contractors Proposal form is divided into sections and the sections approved for construction shall be listed in the Construction Agreement by the Owner. The sections are as follows:

Section BA	-	Buried Plant Housing Stub Pole Units
Section BC	-	Cross-Connecting Assembly Units
Section BD	-	Buried Plant Pedestal Assembly Units
Section BDS	-	Serving Area Interface Cabinet (SAIC) Assembly Units
Section BFC	-	Buried Filled Cable Assembly Units
Section BFO	-	Buried Filled Fiber Optic Cable Assembly Units
Section BG	-	Buried Plant Loading Coil Assembly Units
Section BM	-	Miscellaneous Assembly Units
Section HBF	-	Buried Filled Splice Closure Assembly Units
Section HC	-	Cable Splicing Assembly Units
Section HO	-	Fiber Optic Splicing Assembly Units
Section PM	-	Ground and Miscellaneous Assembly Units
Section W	-	Rearrangement Units
Section XX	-	Nonreusable Materials Removal Units
Section XZ	-	Reusable Materials Removal Units

Each assembly unit includes only the materials listed on the corresponding Installation and Construction Drawings or description of unit where no drawing exists. The various installation and construction units which are included in this Proposal and upon which quotations are required are defined by the following descriptions:

Section BA - BURIED PLANT HOUSING STUB POLE UNITS

Consists of all labor and material for a stub pole in place. Stub poles shall be of the length and type designated by the Engineer as follows:

BA2	6.5 Feet (1.98 m), Round Wood Stub Pole
BA3	8.0 Feet (2.44 m), Round Wood Stub Pole
BA4	10.0 Feet (3.05 m), Round Wood Stub Pole
BA5	13.5 Feet (4.12 m), Round Wood Stub Pole
BA21	6.5 Feet (1.98 m), Sawn Wood Stub Pole
BA22	8.0 Feet (2.44 m), Sawn Wood Stub Pole
BA23	10.0 Feet (3.05 m), Sawn Wood Stub Pole

The stub pole plan, kind of preservative, and method of treatment are designated in the Proposal.

Section BC - CROSS-CONNECTING ASSEMBLY UNITS

Consists of cross-connecting screw type blocks or modules, mounted in place within a housing and spliced to the conductors of the cable as specified by the Engineer. These units identify the pair count for the module or screw type block. This does not include labor and material for installing the jumper wires. The cross-connecting assembly units are as follows:

BC25MB	Cross-connect module, 25 pair, blue for distribution pairs.
BC25MG	Cross-connect module, 25 pair, green for feeder pairs.
BC25MY	Cross-connect module, 25 pair, yellow for electronic pairs.
BC25SB	Cross-connect screw block, 25 pair, blue for distribution pairs.
BC25SG	Cross-connect screw block, 25 pair, green for feeder pairs.
BC25SY	Cross-connect screw block, 25 pair, yellow for electronic pairs.

Section BD - BURIED PLANT PEDESTAL ASSEMBLY UNITS

Consists of a buried plant pedestal, either stake or pole mounted in place. These units include all labor and material to install pea gravel or sealer, housing numbers, route letters, load point numbers, directional and other markings of buried cable. Includes all labor and material to install bonding connectors and harnesses in accordance with REA Splicing Standard PC-2. The buried pedestal units are as follows:

BD2	Buried Plant Pedestal, Type H Stake-Mounted
BD2A	Buried Plant Pedestal, Type H Pole-Mounted
BD3	Buried Plant Pedestal, Type H Stake-Mounted
BD3A	Buried Plant Pedestal, Type H Pole-Mounted
BD4	Buried Plant Pedestal, Type H Stake-Mounted
BD4A	Buried Plant Pedestal, Type H Pole-Mounted
BD5	Buried Plant Pedestal, Type H Stake-Mounted
BD5A	Buried Plant Pedestal, Type H Pole-Mounted
BD7	Buried Plant Pedestal, Type H Stake-Mounted
BD11	Buried Plant Pedestal, Type M Stake-Mounted
BD11A	Buried Plant Pedestal, Type M Pole-Mounted
BD12	Buried Plant Pedestal, Type M Stake-Mounted
BD12A	Buried Plant Pedestal, Type M Pole-Mounted
BD13	Buried Plant Pedestal, Type M Stake-Mounted
BD13A	Buried Plant Pedestal, Type M Pole-Mounted
BD14	Buried Plant Pedestal, Type M Stake-Mounted
BD14A	Buried Plant Pedestal, Type M Pole-Mounted
BD15	Buried Plant Pedestal, Type M Stake-Mounted
BD15A	Buried Plant Pedestal, Type M Pole-Mounted
BD16	Buried Plant Pedestal, Type M Stake-Mounted
BD16A	Buried Plant Pedestal, Type M Pole-Mounted

Note: The splicing capacity shall be in accordance with REA Splicing Standard, PC-2.

Options designated by the following suffixes apply:

Suffix	
B	Internal offset bracket for load coil mounting required.
C	Grounding connector, field mounted within the pedestal, for terminating external ground wire.
G	An additional guard installed in accordance with the Construction Drawing.
H	Housekeeping Panel in sizes BD-3 and larger.
P	Plastic Pad Mount.

Examples:

BD3B	BD3 pedestal with internal offset bracket.
BD4CH	BD4 pedestal with ground connector and housekeeping panel.
BD12ACG	BD12A pedestal with ground connector and additional guard.

Section BDS- SERVING AREA INTERFACE CABINET (SAIC) ASSEMBLY UNITS

Consists of an SAIC either slab, pad, stake or pole mounted in place. Includes all labor and materials to complete the installation, with the exception of the modules or screw blocks. Included in this unit shall be the cabinet; cabinet mounting accessories; internal mounting hardware such as frames, mounting brackets, splicing ladders and talk block; grounding connector, bonding connectors and harnesses in accordance with REA Splicing Standard PC-2; pea gravel or sealer; interface number and direction markings and placement of conduit(s) and such other labor and materials necessary to complete the installation. Detailed plans and specifications further defining these units and establishing specific requirements for each SAIC location are attached hereto and are identified by the name and location of each SAIC.

The SAIC units are as follows:

		Blocks	Modules
BDS1	Small - minimum pair capacity	200	300
BDS2	Medium - minimum pair capacity	600	800
BDS3	Large - minimum pair capacity	1200	1800
BDS4	Extra large - minimum pair capacity	1800	2700

Options designated by the following suffixes apply:

Suffix	Description
M	Framed for cross-connect modules.
B	Framed for screw type blocks.
A	Pole mount.
F	Concrete slab mount.
P	Plastic pad mount.
R	Crushed stone or gravel bed.
S	Stake mount.

Example	
BDS1MA	Small SAI, framed for modules, pole mounted.
BDS2BF	Medium SAI, framed for screw type blocks, concrete slab mounted.
BDS3BS	Large SAI, framed for screw type blocks, stake mounted.
BDS4MP	Extra large SAI, framed for modules, plastic pad mount.

NOTE: Unit designation must indicate type of terminating device - either screw type block or module.

Section BFC - BURIED FILLED CABLE ASSEMBLY UNITS

Consists of 1,000 feet (304.8 m) of buried cable in place. This unit includes all material and labor for plowing or trenching and backfilling, except as specifically provided for in other units.

Options designated by the following suffixes apply:

Suffix	Description
D	Two or more cables placed simultaneously in the same plow slot or trench. Specify all cables within parentheses ( ).
H	Screened cable designated for T1 carrier systems.

H1C	Screened cable designated for T1C carrier systems.
P	Predesignated buried filled cable which will, in the judgment of the Engineer, be much more difficult to install than normal for this project because of the presence of underground facilities or severe right-of-way restrictions. This suffix will be specified on the Construction Sheets in advance of bidding only, and will not be specified later unless changes in the presence of underground utilities, right-of-way easement, or route changes occur that would, in the judgment of the Engineer, greatly increase the difficulty of cable placement. Also, this suffix will be specified during construction when undocumented buried facilities are encountered that, in the judgement of the Engineer, greatly increase the difficulty of cable placement. Predesignated buried filled cable may be installed by plowing or trenching.
T	Buried filled cable which will be placed at the specified depth by trenching only. This unit will be specified by the Engineer on the Construction Sheets only in advance of bidding.

A. This unit also includes:

(1) Clearing of right-of-way. (The Engineer will be responsible for specifying any special conditions or instructions concerning the right-of-way clearing on the Construction Sheets.)

Note 1: Trees that are felled shall be cut to commercial wood length and placed on the side of the right-of-way for the landowner. Commercial wood length means the length designated by the Engineer, but in no case shall be required to be less than 2 feet (0.61 m).

Note 2: Brush, branches, and refuse from the clearing operations shall, without delay, be disposed of by such of the following methods as the Engineer will direct:

Code	Disposition
A	Burned.
B	Removed from the vicinity of the right-of-way.
C	Piled on one side of the right-of-way in such manner as to not obstruct roads, ditches, etc.
D	Other as specified by Engineer.

(2) All labor and material required for the installation of split galvanized steel cable guards installed with the approval of the Engineer for the convenience of the Contractor.

(3) All labor and material required in the repair and/or replacement of streets, sidewalks, roads, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telephone facilities, buried sewerage and drainage facilities, and any other property damaged during the installation of the buried cable, except loss or damage to crops, gardens, ornamental flowers or trees in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor.

(4) The cable installed in place for aerial inserts in buried plant when specified by the Engineer. It includes the miscellaneous accessories such as drive rings, thimbleye nuts, etc., in accordance with the Construction Drawings, not included in other units, needed to secure the buried cable in place. (This unit does not include poles, anchors, guys, riser guards or suspension stand units which will be separately specified by the Engineer.)

(5) The spiraling of buried cable at each aerial insert where there is more than one span involved.

(6) All labor and material including housings, splice closures, stub poles, trenching, backfilling, tamping, cable, straight splicing, and other material and labor required for the purpose of joining cable of the same size and gauge in continuous lengths (reel ends). The housings or closures and all other associated materials and equipment shall be of the same type as required at other cable splicing points specified in the construction of the Project unless otherwise approved by the Engineer.

(7) The labor and material for buried cable installed in Miscellaneous Assembly Units, such as, pipe crossings, rock excavating, asphalt or concrete and ripping. The labor and material required by these miscellaneous assembly units are specified separately.

B. The length of buried cable for compensation purposes is determined by taking the sum of distances between splice or terminal points specified by the Engineer, paralleling the cable. It includes the cable installed in trenches, pipes and non-pipe underground crossings, in sections of aerial construction of buried cable and in vertical runs on poles and in stake-mounted or pole-mounted housings. It excludes lateral and vertical runs of cable required solely for the purpose of joining cable in continuous lengths of the same size and gauge. The length of buried cable installed shall be determined from the sequential number length markers on the outer jacket of the buried cable except where the markings are illegible, found to be in error or an excessive amount of slack has been provided such as in housings, filled splice closures and aerial inserts. Compensation for multiple cables placed in the same plow slot or trench is determined on the basis of the lengths of the individual cables involved.

Each buried cable assembly unit is listed in accordance with the number of pairs and gauge of conductors. Each unit is prefixed by the letters BFC. The following illustrations indicate the method of designating the material required:

BFC(50-24 & 25-19)D	Two cables placed simultaneously in the same plow slot or trench; one a 50-pair, 24-gauge and the other a 25-pair, 19 gauge cable. Quantity, labor and material unit prices are to be specified for each cable separately.
BFC100-22H	A 100-pair, 22-gauge buried cable with a screened cable design.
BFC300-24P	A 300-pair, 24-gauge buried cable which in the judgement of the Engineer will be much more difficult to install than normal because of the presence of underground facilities or severe right-of-way restrictions.

Section BFO - Buried Filled Fiber Optic Cable Assembly Units

Consists of 1,000 feet (304.8 m) of buried fiber optic cable in place. This unit includes all material and labor for plowing or trenching and backfilling, except as specifically provided for in other units.

The following modifications using suffixes apply:

Suffix	Description
D	Two or more cables placed simultaneously in the same plow slot or trench. Specify all cables within parentheses ( ).
P	Predesignated buried filled cable which will, in the judgment of the Engineer, be much more difficult to install than normal for this project because of the presence of underground facilities or severe right-of-way restrictions. This suffix will be specified on the Construction Sheets in advance of bidding only, and will not be specified later unless changes in the presence of underground utilities occur, or right-of-way easement or route changes occur, that would, in the judgment of the Engineer, greatly increase the difficulty of cable placement. Also, this suffix will be specified during construction when undocumented buried facilities are encountered that, in the judgement of the Engineer, greatly increase difficulty of cable placement. Predesignated buried filled cable may be installed by plowing or trenching.
T	Buried filled cable which will be placed at the specified depth by trenching only. This unit will be specified by the Engineer on the Construction Sheets only in advance of bidding.

A. This unit also includes:

(1) Clearing of right-of-way. (The Engineer will be responsible for specifying any special conditions or instructions concerning the right-of-way clearing on the Construction Sheets).

Note 1: Trees that are felled shall be cut to commercial wood length and left on the side of the right-of-way for the landowner. Commercial wood length means the length designated by the Engineer, but in no case shall be required to be less than 2 feet (0.61 m).

Note 2: Brush, branches, and refuse from the clearing operations shall, without delay, be disposed of by such of the following methods as the Engineer will direct:

Code	Disposition
A	Burned.
B	Removed from the vicinity of the right-of-way.
C	Piled on one side of the right-of-way in such manner as to not obstruct roads, ditches, etc.
D	Other as specified by Engineer.

(2) All labor and material required for the installation of split galvanized steel cable guards installed with the approval of the Engineer for the convenience of the Contractor.

(3) All labor and material required in the repair and/or replacement of streets, sidewalks, roads, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telephone facilities, buried sewerage and drainage facilities, and any other property damaged during the installation of the buried cable, except loss or damage to crops, gardens, ornamental flowers or trees in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor.

(4) The cable installed in place for aerial inserts in buried plant when specified by the Engineer. It includes the miscellaneous accessories such as drive rings, thimbleye nuts, etc., in accordance with the Construction Drawings, not included in other units, needed to secure the buried cable in place. (This unit does not include poles, anchors, guys, riser guards or suspension stand units which will be separately specified by the Engineer).

(5) The spiraling of buried cable at each aerial insert where there is more than one span involved.

(6) The labor and material for buried cable installed in Miscellaneous Assembly Units, such as, pipe crossings, rock excavating, asphalt or concrete and ripping. The labor and material required by these miscellaneous assembly units are specified separately.

B. The Buried Filled Optic Cable Assembly Unit does not include labor and material for splicing the individual fibers. All splice points, including reel end splices, shall be specified by the Engineer on

the Construction Sheets. All labor and material required for splicing the fibers and for enclosing the splice, such as, fiber organizers, splice closures, pedestals and stub poles, and miscellaneous hardware items shall be included in other assembly units.

C. The length of buried cable for compensation purposes is determined by taking the sum of all distances between splice or terminal points specified by the Engineer. It includes the cable installed in trenches, pipes and non-pipe underground crossings, in sections of aerial construction of buried cable and in vertical runs on poles and in stake-mounted or pole-mounted housings. The length of buried cable installed shall be determined from the sequential number length markers on the outer jacket of the buried cable except where the markings are illegible or found to be in error. Compensation for multiple cables placed in the same plow slot or trench is determined on the basis of the lengths of the individual cables involved.

Each buried fiber optic cable assembly unit shall be listed. The following illustrations indicate the method of designating the material required:

Example

BF04	Indicates buried filled fiber optic cable with 4 fibers.
(BF04 & BFC100-24)D	Indicates a 4 fiber, buried filled fiber optic cable and a 100 pair, 24 gauge buried filled cable, placed in same plow slot or trench. Quantity, labor and material unit prices are to be specified for each cable separately.

Section BG - Buried Plant Loading Coil Assembly Units

A. Loading Coil Assembly Unit - Consists of either a universal load coil assembly with a filled plastic cable stub or encapsulated loading coils in 1, 3, 12, 18 and 25 coil units. The coils may be either standard or mini and with an inductance of either 66 or 88 millihenries. This unit includes the labor and materials for mounting in place and splicing to the cable conductors as specified by the Engineer. The loading coil assembly units are as follows:

Standard	Mini	
BG22	BGM22	Universal Load Coil Assembly Unit with 50 to 400 coils as specified.

BG32	BGM32	Encapsulated Load Coil in 3, 12, 18 and 25 coil units.
BG35	BGM35	Encapsulated single stackable coil unit.

The following suffixes apply to loading coils:

Suffix

( ) In the first parentheses insert either 66 or 88 millihenry

( ) When a treated plank is required insert as follows:

A - Place a treated plank over the load coil case.
B - Place a treated plank under the load coil case.
C - Place a treated plank over and under the load coil case.

The illustration below indicates the method of designating the material required:

BG22-200(66)(A)	A universal load coil with 200 standard 66 millihenry coils installed with a treated plank.
BGM32-25-(66)	Encapsulated load coil assembly of 25 mini 66 millihenry coils.
BG35-5-(88)	Stackable load coil assembly consisting of five individual 88 millihenry coils.

Section BM - MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and material to construct and install the units defined individually below required for the installation and construction of the buried cable portions of the Project:

BM2( )( ) Housing Ground Assembly Unit - Consists of the necessary labor and material for the installation of a ground rod, ground rod clamp and the required length of an insulated #10 AWG tinned copper ground wire connected to an auxiliary grounding connector (included in the housing assembly unit) within the housing. Indicate the desired diameter and length of ground rod. For a sectionalized ground rod and coupling device use the suffix "S".

Example:	BM2(1/2)(5)	A 1/2 inch X 5 foot ground rod.
	BM2(5/8)(10)	A 5/8 inch x 10 foot ground rod.
	BM2(5/8)(20)S	Two 5/8 inch x 10 foot sectionalized ground rods and a coupling device. Where sectionalized ground rods are required the total length should appear on the Construction Sheets.

BM2A — Housing Auxiliary Ground Assembly Unit - Consists of the necessary labor and material for the installation of a grounding connector to a pole ground wire and the required length of an insulated #6 AWG copper ground wire connected to an auxiliary grounding connector (included in the housing assembly unit) within the housing.

BM2B — Housing Ground Assembly Unit - Consists of the necessary labor and materials for the installation of a bonding connector bracket within an existing housing. The bonding connector bracket should be the bracket that is recommended by the housing manufacturer.

BM2C — Existing Facility Bonding Assembly Unit - Consists of the necessary labor and material for bonding new cables in existing facilities, such as, buried plant housings and splice closures. This unit includes a single bonding connector and a single bonding harness.

BM6M — Suspension Strand Assembly Unit - Consists of 1,000 feet (304.8 m) of 6M (6,000 pounds--2722 kg) suspension strand, supporting hardware, lashing wire, cable straps, and all other accessories required for aerial insert construction in buried plant, but excludes the buried cable. This unit will be used for short sections of aerial construction in buried plant. When such aerial inserts are required, the Engineer will specify the pole, riser guard, guy and anchor assembly units required, plus the appropriate quantity of this unit. The Contractor will be compensated for these units at their respective bid prices plus the appropriate cable units including the vertical length on the end poles.

BM10M — Suspension Strand Assembly Unit - This unit is the same as the BM6M unit except that the size of the strand is 10M (10,000 pounds--4536 kg).

BM16M — Suspension Strand Assembly Unit - This unit is the same as the BM6M unit except that the size of the strand is 16M (16,000 pounds--7257 kg).

BM53 — Warning Sign Assembly Unit - Consists of one stake-mounted warning sign, in place as shown on the Construction Drawings. This unit includes all labor and material to install the stake-mounted sign.

BM54 — Route Sign Assembly Unit - Consists of one stake-mounted route sign, in place, as shown on the Construction Drawings. This unit includes all labor and material to install the stake-mounted sign.

BM55 — Splice Location Sign Assembly Unit - Consists of one stake-mounted splice location sign, in place, as shown on the Construction Drawings. This unit includes all labor and material to install the stake-mounted sign.

BM55A — Buried Splice Location Assembly Unit - Consists of one buried splice location assembly unit installed in or above the buried splice case. The installation of the buried splice location unit shall be in accordance with the manufacturer's instructions. If the owner has standardized on a specific system, the engineer shall so indicate.

BM60-( ) — Underground Pipe Crossing Assembly Unit - Consists of one (1) lineal foot (0.31m) of steel pipe, with the inside diameter in inches specified in parentheses, installed in place. This unit includes the pushing of pipe and any excavation, backfilling and tamping necessary for the installation of the pipe. The pipe will be installed at the depth specified by the Engineer. The installed pipe shall be free of any sharp projections to avoid damage to the outer jacket of the buried cable during its installation in the pipe. The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM61 — Underground Non-Pipe Crossing Assembly Unit - Consists of the labor in providing a hole in soil one (1) foot in length (0.31m) and of a diameter sufficient to accommodate the buried cable to be installed therein, but not to exceed three (3) inches (7.62cm). The depth of the hole below the surface of the ground shall be specified by the Engineer. This unit includes any excavation, backfilling and tamping necessary for the installation. This unit may be used where the permanent installation of a steel pipe under the BM60 unit is not required. The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM66-( ) — Bridge Attachment Assembly Unit - Consists of the necessary labor and material for installing one (1) lineal foot (0.31m) of galavanized steel pipe or plastic conduit, of the inside diameter in inches specified, along bridges. Details of the method of installation will be in accordance with the Plans and Specifications. The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM71 — Rock Excavating Unit - Consists of one (1) lineal foot (0.31m) of trenching, blasting, sawing, etc., measured parallel to the surface of the ground, in rock, including excavation, backfilling and tamping to place cable to the depth specified in the Specifications. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telephone facilities and any other property damaged by the excavating, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor.

This unit will be specified by the Engineer only when field conditions at the site show the existence of rock to a depth required by the specification which cannot be trenched, plowed or ripped. The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM72 Asphalt Assembly Unit - Consists of labor and material necessary to remove and restore one (1) lineal foot (0.31m) of asphalt pavement (where the removal does not necessitate the breaking up of concrete) measured along the route of the cable. Any trenching which may be necessary for the installation of buried cable is included in this unit. All work shall be performed as required in accordance with federal, state and/or local construction standards in effect at the time of bid date. (Pursuant to these federal, state and/or local standards, restoration may include the use of any base and sub-base materials such as concrete, crushed stone, etc.). The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM73 Concrete Assembly Unit - Consists of the labor and material necessary to remove and restore one (1) lineal foot (0.31m) of concrete pavement (or any combination of concrete pavement and other surfacing material) where the removal necessitates the breaking up of concrete pavement, measured along the route of cable. Any trenching which may be necessary for the installation of buried cable is included in this unit. All work shall be performed as required in accordance with federal, state and/or local construction standards in effect at the time of bid date. (Pursuant to these federal, state and/or local standards, restoration may include the use of any base and sub-base materials such as concrete, crushed stone, etc.) The contractor will be compensated for labor and material for the buried cable under the BFC, BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM76 Ripping-Unit - Consists of one (1) lineal foot (0.31m) of ripping, measured parallel to the surface of the ground, including restoration (rock removal, backfilling, etc.) and clean-up of the rip. This unit provides a ripped path to allow cable placement by the cable plow at the required depth and may require more than one ripping pass to achieve the depth. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks,drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telephone facilities, buried sewerage and drainage facilities and any other property damaged by ripping, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor. This unit will be specified by the Engineer only when field conditions at the site are such as to prevent plowing in accordance with the requirements of the Specifications. The contractor will be compensated for labor and material for the buried cable under the BFC BFCP, BFCT, BFO, BFOP, or BFOT cable unit.

BM80 Riser Guard, 1" ID x 8' (2.54 cm x 2.44 m).

BM81 Riser Guard, 2" ID x 8' (5.08 cm x 2.44 m).

BM82 Riser Guard, 3" ID x 8' (7.62 cm x 2.44 m).

BM90( ) ( ) ( ) Compartmental-Core Cable Carrier Stub Assembly Unit - Consists of one filled compartmental-core cable stub placed between the SAI cabinet and carrier electronic cabinet. This unit includes termination of all pairs in the cable stub within the SAI cabinet on splice or cross-connect modules or blocks, or hard-wired using mechanical splicing connectors. This unit also includes furnishing and mounting splice cross-connect modules or blocks or mechanical splicing connectors, as specified by the Engineer. The cable pair size shall be indicated in the first parentheses; the pair gauge shall be indicated in the second parentheses; and the stub length in feet shall be indicated in the third parentheses.

Section HBF - Buried Filled Splice Closure Assembly Units

Consists of a buried splice closure and the closure manufacturer's provided encapsulating material, installed in place and the labor and material for setting up in preparation for installing the closure, such as, excavating a splicing pit, opening the jacket, bonding of the cable shields, filling the closure in accordance with the manufacturer's instructions and options when specified. Cable splicing shall be compensated under the appropriate splicing units.

The assembly units are as follows:

HBF ( ) Buried Filled Closure - A filled splice closure with pair count and gauge for each cable to be spliced:

HBFO ( ) Buried Filled Fiber Optic Closure - A fiber optic closure and organizer with the number of fibers to be housed in the organizer.

NOTE: Options designated by the following suffixes apply:

Suffix

A - A treated plank with nominal dimensions of 2" x 12" x 3' (5.08 cm x 30.48 cm x 0.91) shall be placed 6" (1.83 m) above the closure.

B - A treated plank with nominal dimensions of 2" x 12" x 3' (5.08 cm x 30.48 cm x 0.91) shall be placed as a base support for the closure.

C - A treated plank with nominal dimensions of 2" x 12" x 3' (5.08 cm x 30.48 cm x 0.91) shall be placed above and below the closure.

H - Includes a handhole with the necessary excavation, backfilling and placement and the necessary materials to make an appropriate installation in accordance with the detailed Plans and Specifications. The top of the handhole shall be flush with the ground surface.

J - Same as that indicated above for suffix "H" except that the handhole shall be installed below the ground surface as shown on the Construction Drawings.

The illustrations below indicate the method of designating the above modifications.

HBF (100-24) C	Buried filled closure enclosing two cable ends same pair count and gauge. The closure shall be provided with a treated plank above and below.
HBF (200-24) (100-24)A	Buried filled closure enclosing two cable ends with different pair counts provided with a treated plank above.
HBF (600-24) (200-24) (200-24) (200-22)	Buried filled closure enclosing four cable ends with pair counts and gauges as shown.
HBFO (4)	Buried filled fiber optic splice closure and organizer capable of accommodating a minimum of four fibers.

Section HC - Cable Splicing Assembly Units

HC-1 Consists of the labor and material necessary in the wire work and splicing of 100 cable pairs in any cables, including non-working pairs in existing cables in accordance with REA Splicing Standard PC-2 using individual mechanical splicing connectors. The splice may be straight, bridged, or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer in advance of bidding, are considered to be part of this unit. On aerial inserts, each end of the fuse link is considered as a splice. This unit is applicable to the conductor splicing of filled and nonfilled cables.

NOTE: Only those pairs on which splicing or capping operations are performed are counted and each pair is counted only once in each splice. For example, assume a 100-pair cable is spliced into a 200-pair cable at a point where the 200-pair cable continues. This splice comprises 1.0 unit. Also, assume a 75-pair cable is spliced to a 100-pair cable and the remaining 25 pairs of the 100-pair cable are capped. This splice comprises 1.0 unit.

HC-3 Consists of the labor and material necessary in the wire work and splicing of 100 cable pairs in any cables, including non-working pairs in existing cables in accordance with the REA Splicing Standard PC-2 using splicing modules. The splice may be straight, bridged or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer in advance of bidding, are considered to be part of this unit. On aerial inserts, each end of the fuse link is considered as a splice. This unit is applicable to the conductor splicing of filled and nonfilled cables.

NOTE: Only those pairs on which splicing operations are performed are counted in this unit and each pair is counted only once in each splice. For example, assume a 100-pair cable is spliced into a 200-pair cable at a point where the 200-pair cable continues. This splice comprises 1.0 unit.

HC-4 Consists of the labor and material for placing and connecting both ends of 100 pairs of cross-connect jumper wires on cross-connecting blocks and modules.

Section HO - Fiber Optic Splicing Assembly Units

Consists of all labor and material necessary to splice one glass fiber in any cable in accordance with recommended industry practices subject to the acceptance by the engineer. The labor shall include initial measurement, minimizing the attenuation, splicing and stowing the spliced fiber in a fiber organizer. The labor and material for the fiber organizer is part of the appropriate splice closure unit.

The following suffixes apply:

HO-1 Fusion Splice

HO-2 Mechanical Splice

HO-3 Connector Splice

Section PM - GROUND AND MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and material to construct and install the following units:

PM21 Central Office Cable Entrance - Consists of tip cables (if prestubbed main frame is not furnished), miscellaneous materials, splice closures, splicing, excavating, drilling entrance holes, placing outside plant cable to the tip cable splice, and placing the tip (stub) cables from the splice to the main distribution frame, fanning, forming, wire wrapping or soldering, and bonding of tip cable shields to the central office ground, and all incidental work necessary to make an entrance installation. Detailed Plans and Specifications defining the unit and establishing the specific requirements for each central office are identified by the name and location of the office.

PM22 Central Office Grounding System - Consists of the necessary auxiliary ground electrodes, trenching, backfilling, bonding the auxiliary ground electrodes to each other and to the primary ground electrodes, bonding to the main frame and to the electric system ground to make an appropriate installation in accordance with the detailed Plans and Specifications. Each central office grounding assembly unit is identified by the name and location of the office.

Section W - Rearrangement Units

Specific rearrangement units shall be designated and described by the Engineer on Table B, of REA Form 515. Existing plant assembly units to be rearranged are designated by a prefix "W".

Section XX - Nonreusable Materials Removal Unit

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines, and transporation of the removed materials to points designated by the Engineer. The Contractor will be permitted to use the most economical method of removing these units. The removal units are designated by the prefix "XX" followed by the assembly unit designation of the unit to be removed. For example, XXC25-22 denotes the removal of 1,000 feet of 25 pair, 22 gauge aerial cable which is not to be reused on the system but is to be delivered to a location designated by the Engineer.

Section XZ - Reuseable Materials Removale Units

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines and all labor and transportation of the removed materials to the warehouse of the Owner in an orderly manner or transporting them elsewhere in the site of the project for reuse where similar units are required in the prosecution of this contract. The Contractor will be charged by the Owner for the materials removed under this section at the unit material values shown in column 2 of Table A, of REA Form 515. The number of units to be charged to the Contractor and the extended value of these units are shown in columns 3 and 4. Such charges will be placed against the Contractor as assembly units are removed and the unit material values will be deducted from the total value of assembly units constructed on this project for determination of the work accomplished for purposes of the monthly progress payments to the Contractor. Of the assembly units listed in Table A to be removed from existing lines certain units are to be reused in the construction of the project. The quantity of such units to be reused is listed in Table A, column 5. These units where installed in the project will be inventoried as new assembly units and compensated for at the unit bid prices. The quantity of assembly units listed in column 6 of Table A is the maximum quantity of removed assembly units that are to be returned to the Owner for credit which will be allowed at the unit material prices in column 2. Column 7 indicates the extended value of the units to be returned to the Owner. The Contractor will be allowed credit for assembly units listed in column 6 which, in the opinion of the Engineer, have not been damaged by the Contractor in removal and handling. Such credits will be allowed the Contractor as the assembly units are returned to the Owner's warehouse and shall be added to the total value of installed assembly units for determination of work accomplished for the purposes of the monthly progress payments to the Contractor. The removal units are specified by the prefix "XZ" followed by the assembly unit designation of the existing assembly unit to be removed. For example, XZ CF18-24 denotes the removal of a 18 pair, 24 gauge Figure 8 Cable assembly unit which is to be reused on the system or is to be turned in to the Owner's warehouse for credit.

Part II - SPECIFICATION FOR MATERIALS

1. SCOPE

1.1 This part of the specification is concerned with the various materials required for the construction of the outside buried cable and wire plant of the rural telephone system as shown on the Plans and Construction Drawings.

2. GENERAL

2.1 All materials used in the construction of the rural telephone system except those listed in Paragraph 4 below shall be taken from the "List of Materials Acceptable for Use on Telephone Systems of REA Borrowers."

3. STUB POLES

3.1 The stub pole plan, method of treatment, kind of preservative and general procedure applying to all stub poles shall be in accordance with the latest REA specifications in effect at the time the bids are received.

4. MISCELLANEOUS

4.1 Incidental items for which catagories do not appear in the "List of Materials Acceptable for Use on Telephone Systems of REA Borrowers," must be of a quality suitable for the application for which they are intended.

Part III - SPECIFICATION FOR CONSTRUCTION AND INSTALLATION

1. GENERAL

1.1 All construction and installation work shall be done in a thorough and workmanlike manner in accordance with the Plans, Specifications and Construction Drawings and shall be subject to acceptance by the Owner and the Administrator.

1.2 All material to be used in construction of the Project shall be stored so as to be protected from deteriorating effects of the elements. The Contractor shall bear in mind the weather conditions that may prevail prior to the time the material is incorporated into the plant. If metallic items of material are not to be stored longer than 30 days, and outdoor storage cannot be avoided, they shall be stacked on boards or timbers well above the ground line and effectively protected from the elements by a roof or tarpaulin. For brief periods only (not over 30 days) these metallic materials may be stored in the open, exposed to the elements, provided they do not come into contact with the ground.

1.3 All buried cable used in the construction of the Project must be handled with care. The cable facilities must not be trampled upon, run over by vehicles, pulled along the ground, over fences or metal fittings. Each reel shall be inspected for cuts, nicks or other damage. All damage shall be repaired to the satisfaction of the Engineer and in accordance with the methods or other instructions described in the appropriate paragraphs of Part III. The reel wrap shall remain intact on the reel unit the cable is ready to be placed.

1.4 Deviations from the Plans, Specifications and Construction Drawings shall not be permitted except upon written permission of the Engineer.

1.5 The latest revision of the National Electrical Safety Code and the National Electrical Code shall be followed in every case except where local regulations are more stringent, in which case local regulations shall govern.

1.6 The Contractor shall maintain conductor polarity (tip and ring) identification at the main distributing frame, buried plant housings, splice closures and in the service entrance, all in accordance with the Specifications and Construction Drawings.

2. BURIED PLANT HOUSING POSTS

2.1 The setting depth of stub poles where specified and used as pedestal posts in connection with the mounting of buried plant housings, shall be 3.0 feet (0.91 m) in soil and as specified by the Engineer in solid rock. If a greater depth in soil is necessary, the Engineer will indicate the required depth in the Proposal.

2.2 The bottom of the hole shall be thoroughly tamped to compact any loose earth that may be present.

3. CABLE SPLICING

3.1 Splicing for paired, copper conductor, cable and wire shall be in accordance with REA Splicing Standard PC-2.

3.2 Cable splicing for fiber optic cables shall be in accordance with standard industrial practices, providing that the practice is acceptable to the Engineer.

4. BURIED CABLE

4.1 General

4.1.1 The Contractor shall perform cable laying operations by starting at the central office and advancing outwards without any breaks to the end of the leads, unless otherwise directed by the Engineer.

4.1.2 The plowing equipment shall be subject to the approval of the Engineer and the public authorities having jurisdiction over highway and road rights-of-way.

4.1.3 The design of the plowshare shall be such that the buried cable passing through the plow will not bind and shall not be bent in a radius less than 10 times the outside diameter of the cable. The plowshare shall have a removable gate for the purpose of inspection, and a hinged fairlead which shall be equipped with smooth, free wheeling rollers or low friction surfaces to prevent damage to the cable passing through.

4.1.4 The equipment shall be capable of extending the plow in order to maintain the required minimum depths under all terrain conditions.

4.1.5 The engineer should periodically inspect the cable as well as the installation equipment and procedures during installation to guard against damage to the cable when it is being placed in the ground, and to see that proper depth is maintained at all times.

4.1.6 The Contractor shall promptly repair any damage to fences, lawns, shrubbery, drives and any other property damaged during construction.

4.1.7 A ripping unit (BM76) shall be specified where a plow train capable of delivering a minimum of 55,000 pounds (2.45×10^5 N) drawbar pull at 1.2 MPH (1.93 km/hr) forward speed is incapable of plowing the cable at the specified depth in soil.

4.1.8 A rock excavating unit (BM71) shall be specified where a plow train capable of delivering a minimum of 55,000 pounds (2.45×10^5 N) drawbar pull at 1.2 MPH (1.93 km/hr) forward speed is incapable of ripping to the specified depth.

4.1.9 The equipment and construction methods used by the Contractor shall be such as to cause minimum displacement of the soil. The slot made in the soil by the cable plow shall be closed immediately by driving a vehicle track, or wheel over the slot or by other suitable means.

4.1.10 Damage to banks, ditches, driveways and roads caused by the equipment shall be immediately repaired to the satisfaction of the Engineer and public authorities having jurisdiction over highway and road rights-of-way where involved.

4.1.11 Where cables are buried near the edge of pavements, the Contractor shall take particular care to avoid damaging the pavement. If such damage does occur repairs shall be made immediately to meet the requirements of state or local authorities having jurisdiction over the pavement involved.

4.1.12 The stub pole or stake portion of stake-mounted housings shall be installed in accordance with the Construction Drawings in a manner not to damage the cable or wire placed in the trench.

4.1.13 The Contractor shall exercise particular care in the use of trenching equipment and shovels in joining trenches to the slots made by the plow to be certain that the cable is not damaged.

4.1.14 To avoid possible damage to buried cable from exposure to traffic, livestock and other hazards, trenching of laterals, trenching around culverts, construction of aerial inserts and similar operations shall be completed as soon as practicable behind the plowing operation.

4.1.15 Trenches shall be promptly backfilled with earth and tamped with a mechanical tamper at 6 inch (15.24 cm) lifts so that the earth is restored to original grade to assure no hazard to vehicular, animal or pedestrian traffic. No trenches shall be left open overnight.

4.1.16 When placing cable in a trench in rock, the cable shall be cushioned by a fill of sand or selected soil at least 2 inches (5.08 cm) thick on the floor of the trench. The backfill for at least 4 inches (10.16 cm) above the cable shall be free from stones, rock or other hard or sharp materials which might damage the cable. Alternate methods are permissible subject to approval of the Engineer.

4.2 Handling of Cable

4.2.1 Cables shall be carefully inspected by the Contractor during the plowing and trenching operation prior to their installation in the project to be certain that they are free from defects.

4.2.2 Bends of small radii and twists that might damage cable shall be avoided. During the placing operation, cable shall not be bent in a radius less than 10 times the outside diameter of the cable or wire.

4.2.3 Care is to be exercised during the plowing operation, to feed the cable into the ground through the plow loosely and at no tension. Equipment and construction methods shall be such as to assure compliance with this requirement. The Contractor shall furnish competent supervision at all times at the site of plowing operations to assure compliance with this requirement.

4.2.4 If, during the plowing operation, the plow should strike a buried object or rock that stops the equipment and necessitates removal of

the plow from the ground, the plow shall be removed from the ground carefully, and if practicable without backing the plow, to avoid damage to the cable. Should it be necessary to back the plow to remove it from the ground, the cable shall be uncovered a sufficient distance back for inspection by the Engineer to determine whether the cable has been damaged.

4.2.5 Every instance of damaged cable observed at any time whether prior to installation in plant, occurring during construction, or discovered by test or observation subsequent to installation in plant, shall be immediately called to the attention of the Engineer. The method of repair or correction of such damage shall be in accordance with the written instructions of the Engineer. The Contractor shall promptly repair such damage or make such corrections in accordance with such written instructions of the Engineer. Minor damage to the outer jacket of the cable observed prior to or occurring during construction shall be repaired in accordance with REA Splicing Standard PC-2.

4.2.6 Damage to cable of greater severity than that set forth in Paragraph 4.2.7.1 below, observed prior to or during construction, shall be corrected as follows:

4.2.6.1 The damaged section of cable shall be enclosed in (1) a buried plant pedestal located as specified by the Engineer or (2) a buried filled splice closure if approved by the Engineer, buried to the same depth as that specified for the cable. If the shield has been broken or the conductor insulation damaged, the cable shall be restored to the equivalent of new condition. This may require cutting out the damaged section of cable if required by the Engineer.

4.2.7 Damage to cable discovered after burial either through test or observation shall be repaired as follows:

4.2.7.1 The damaged section of cable shall be repaired as approved by the Engineer. This may require cutting out the damaged section and replacing it with a short section of new cable with splices made in (1) buried plant pedestal or (2) buried filled splice closures, if approved by the Engineer, which are buried to the same depth as that required for the cable. It may also require the replacement of an entire section between housings already installed.

4.3 Depth of Buried Plant

4.3.1 Unless otherwise specified by the Engineer in the Proposal, or on the Construction Sheets, the depth of buried cable either plowed or trenched, measured from the top of the cable to the surface of ground or rock shall be as listed in the following table:

Minimum depth in soil	24" (60.96 cm)
Minimum depth at ditch crossings	36" (91.44 cm)
Minimum depth in rock	6" (15.24 cm)

4.3.2 In the case of a layer of soil over rock, either the minimum depth in rock, measured to the surface of the rock, or the minimum depth in soil, measured to the surface of the soil, may be used at the Contractor's

option.

4.3.3 When rock excavating is specified the minimum depth of 6 inches (15.24 cm) shall apply only when the width of the opening is 6 inches (15.24 cm) or less. If the width of the opening is greater than 6 inches (15.24 cm) or ripping is used, then the minimum acceptable depth will be 18 inches (45.72 cm). Either the minimum depth in rock shall be achieved or some other method may be employed by the Contractor to provide adequate protection to the cable as agreed to by the Engineer.

4.4 Splicing and Terminations

4.4.1 Buried services shall be spliced directly to the appropriate pair of the buried cable, as specified by the Engineer.

4.4.2 For the purpose of joining buried cable at reel ends, the buried cable shall be made continuous by splicing the conductors directly together either in a pedestal or a buried splice closure. The location shall be specified by the Engineer.

4.4.3 Splicing and termination of cable pairs shall be in accordance with the circuit schematic drawings issued by the Engineer.

4.4.4 All splices and terminations of cable pairs in buried splice closures shall be electrically tested to assure freedom from opens, shorts, crosses and grounds and all defects cleared prior to closing the splice closure. Shield continuity will be checked. The locations of buried splice closurers shall be accurately marked on the "as built" construction sheets.

4.4.5 Buried plant pedestals or filled splice closures utilized for the purpose of joining buried, paired, copper conductor, cable and wire of the same size and gauge in continuous lengths shall be in accordance with REA Splicing Standard PC-2.

5. MISCELLANEOUS - BURIED PLANT

5.1 The separate steel stakes of stake-mounted housings shall be driven a minimum of 12 inches (30.48 cm) in undisturbed earth in a vertical position and faced in accordance with the Construction Drawings. Care shall be exercised in the installation not to bend or otherwise damage the housings. Route and housing numbers shall be installed when the housing is installed. Housing covers shall be secured in the closed position at all times except when work is being performed within the housing.

5.2 The shields of all buried, paired, copper conductor, cable and wire shall be connected together at all splices and termination points, as specified in REA Splicing Standard PC-2 to assure a continuous metallic shield throughout the buried plant. Buried cable shields shall also be connected to the ground connectors in buried plant housings and to other ground installations as shown on the Construction Drawings and in REA Splicing Standard PC-2.

5.3 Stake-mounted warning, route, and splice location signs shall be installed in accordance with the Construction Drawings and in locations

as specified by the Engineer. As an alternate to the splice location sign, the Engineer may specify the use of a buried splice location device (BM 55A).

5.4 Buried cable and wire, including buried services, terminated or spliced in a housing shall be directionally marked as specified on the Construction Drawings. The directional markers shall be installed at the time the cable is placed in the housing and before the lateral trench to the housing is backfilled.

5.5 Where aerial inserts in buried plant are specified by the Engineer, the construction shall be accomplished if possible without cutting the cable. Where due to physical conditions, in the opinion of the Contractor, the cutting and splicing of cable are necessary, prior approval to cut the cable shall be obtained from the Engineer. The splicing of paired, copper conductor, cable shall be in accordance with REA Splicing Standard PC-2.

5.6 Junctions between buried cable and noncable type aerial circuits shall be made in accordance with the applicable Construction Drawings.

5.7 Loading coil units shall be mounted and spliced in accordance with REA Splicing Standard PC-2 and the cable schematic drawings furnished by the Engineer.

5.8 All products utilized to control rodents, insects, wasps or hornets should be specifically formulated for the telephone industry and applied in accordance with the instructions or directions detailed on the manufacturer's product label.

5.9 Buried cable and wire from the cable and wire placement route to the buried plant housing shall be run at right angles to the cable and wire route. Both "in" and "out" laterals shall be in the same trench (See guide drawing 902A).

6. SPECIAL REQUIREMENTS FOR INSTALLATION OF SERVING AREA INTERFACE CABINETS

6.1 Specific installation instructions for the pad or slab base preparation and construction, placement of conduit(s), and the assembly and installation cabinet will be provided by the cabinet manufacturer and/or the Engineer.

6.2 A drainage hole shall be cut in the bottom of the flexible conduit placed between two cabinets, at the low point of the radius of bend.

6.3 All vacant or unused conduit shall be sealed using heat shrinkable end caps or conduit plugs.

6.4 Specific installation instructions for the stake- or pole-mounted cabinet assembly will be provided by the cabinet manufacturer and/or the Engineer.

6.5 The separate stakes of stake-mounted cabinets shall be driven a minimum 12 inches (30.48 cm) in undisturbed earth in a vertical position and faced in accordance with the cabinet manufacturer's and/or Engineer's instructions.

6.6 All special installation tools for splicing and placing cross-connect jumper wires shall be used as indicated by the manufacturer.

6.7 Where conventional hard-wire splicing is employed at SAI locations, the splicing and lay-up of conductor pairs shall be in accordance with REA Splicing Standard PC-2 and/or special instructions issued by the Engineer.

6.8 Pair counts shall be shown on all splice, feeder and cross-connect modules or blocks identifying feeder, distribution and carrier terminations.

6.9 Pair count tags shall be used on bundle pair counts where hard-wire splicing is employed. On bundle tags, feeder, feeder/distribution, distribution and carrier cable identification, pair counts shall be shown.

LIST OF CONSTRUCTION DRAWINGS AND PLANS

Assembly Unit Drawings

Section BM - Miscellaneous Assembly Units for Buried Plant

BM2, -2A	Ground Wire Assembly, Buried Plant
BM53, BM54, BM55	Warning, Route and Splice Sign, Stake-Mounted
BM80, BM81, and BM82	Riser Guards

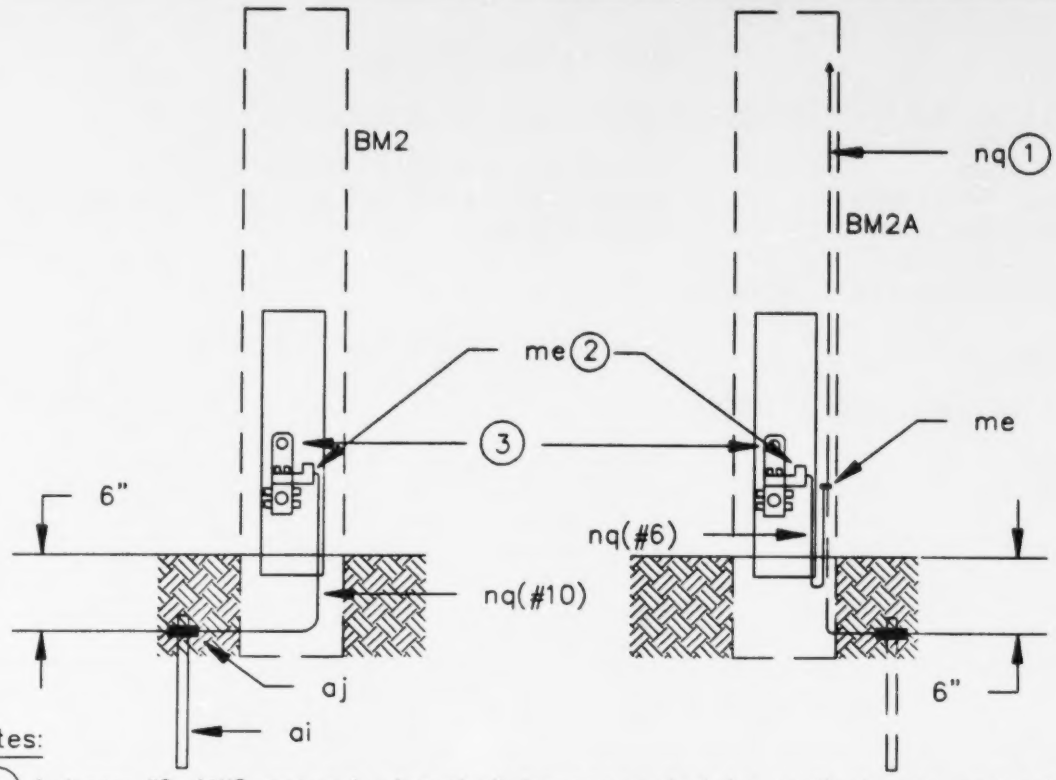
Miscellaneous Guide Drawings

815-1	Buried Plant Conductor Polarity Diagram

Buried Plant Guide Drawings

902A	Lateral Runs to Buried Plant Housings
905	Installation of Type M Pole-Mounted Pedestal at Increased Height
906	Type "H" and Type "M" Pedestals - Pole - and Stake Mounted
907	Load Coil Cases and Splice Closures - Direct Burial
910	Rodent Protection for Buried Plant Housings
912	Aerial Drop Wire to Buried Plant
943	Typical Handhole Installation
951	Aerial Insert in Buried Plant Construction
952	Protection of Buried Cable from Power Contact to Aerial Inserts
965	Placement of Numbers and Letters on Housings
969	Application of Guard Assembly
971-1	Wiring Arrangement at Junction of New Aerial Cable with Buried Wire or Cable
971-2	Junction of Aerial Cable with Buried Cable or Wire
972	Facing of Cable Housings and Signs
975	Buried Plant Under Ditches
976	Housing Installation Details
1001	Typical Concrete Slab - Plan View for SAI and Electronic Equipment Housing
1003	Typical Conduit and Cable Installation in Slab Base for SAI Cabinet
1004	Typical Crushed Stone Type Pad for SAI Cabinet
1005	Typical Plastic Pad for SAI Cabinet
1009	Typical SAI Housing - Miscellaneous Details
1010	Typical Installation of a SAI Cabinet with Cable Stub to Pole-Mounted Electronic Equipment
1011	Typical Installation of a Stake-Mounted SAI Cabinet with Electronic Cable Stub to a Slab or Pad-Mounted Electronic Equipment Housing
1012	Typical Installation of a Pole-Mounted SAI Cabinet with Cable Stub to Pole Mounted Electronic Equipment

NOTE: On the Assembly Unit Drawings an asterisk (*) in the ITEM column indicates items that are no longer listed in the REA List of Materials.



Notes:

(1.) A bare #6 AWG ground wire shall be connected to vertical pole ground wire of multigrounded power system neutral or pole ground assembly (PM2). If a multigrounded power system neutral is present on the pole but there is no vertical pole ground wire, sufficient length of #6 AWG copper ground wire shall be left coiled and taped to permit it to be extended up the pole and connected to the multigrounded neutral by a representative of the power company.

(2.) The use of an auxiliary grounding connector, when required, shall be field installed within the housing in accordance with the housing manufacturer's instructions.

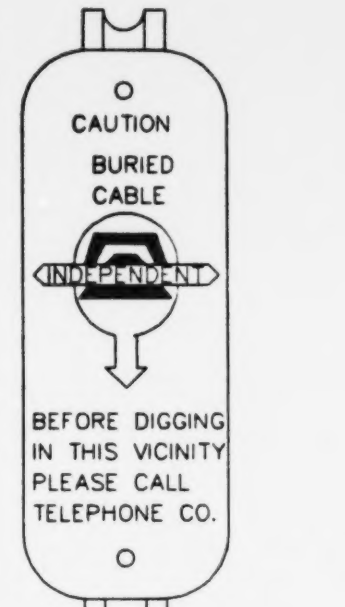
(3.) The bonding bracket shall be installed in accordance with the housing manufacturer's instructions.

ITEM	MATERIAL	REQ'D	ITEM	MATERIAL	REQ'D
*nq	Wire, ground, insulated #10 AWG	as req'd	*nq	Wire, ground, bare	as req'd
	tinned copper			#6 AWG	
ai	Rod, ground (size & length as req'd)	1			
me	Connector, ground	2			
aj	Clamp, ground rod	1			

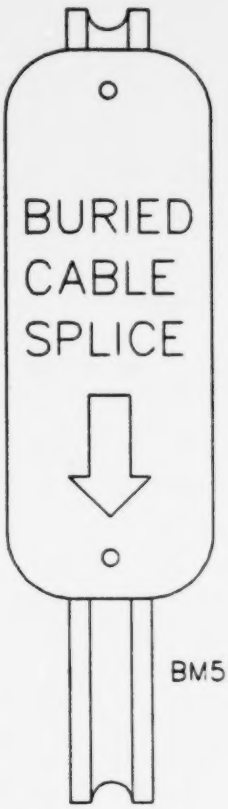
RURAL TELEPHONE CONSTRUCTION PRACTICES
GROUND WIRE ASSEMBLY, BURIED PLANT

Scale: NTS | January 1988

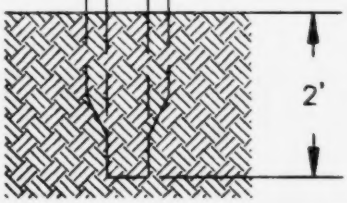
BM2 – BM2A



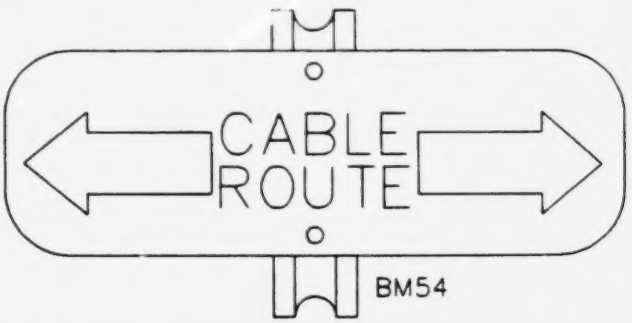
BM53



BM55



2'



BM54

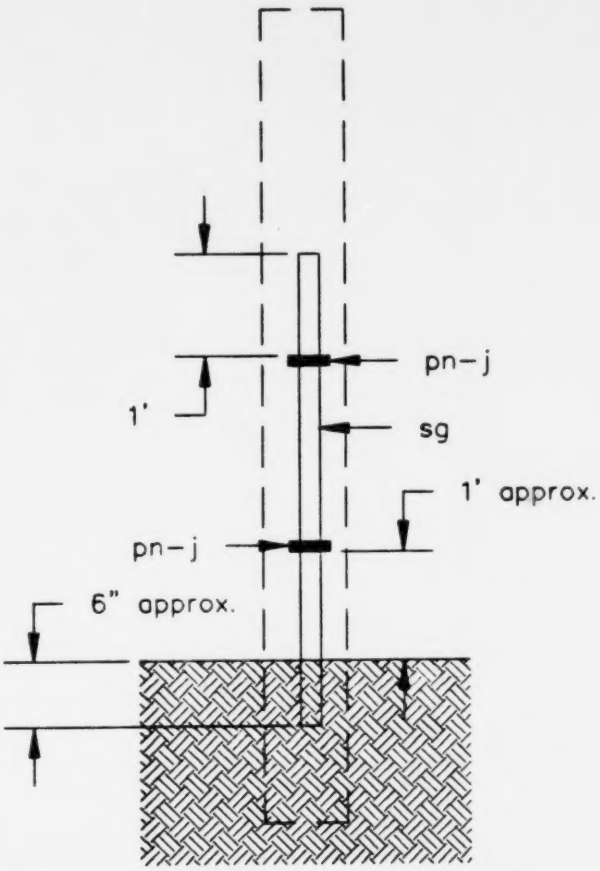
Notes:

1. The stake shall be driven vertically into undisturbed soil.
2. Face signs in accordance with Guide Drawing 972.
3. The signs shall be mounted to the stake in accordance with the manufacturer's instructions.

ITEM	MATERIAL	ITEM	MATERIAL
sm	Warning sign, stake-mounted	sm	Splice sign, stake-mounted
sm	Route sign, stake-mounted		

RURAL TELEPHONE CONSTRUCTION PRACTICES
WARNING, ROUTE, AND SPLICE SIGN, STAKE-MOUNTED

Scale: NTS		November 1977
		BM53, BM54, BM55



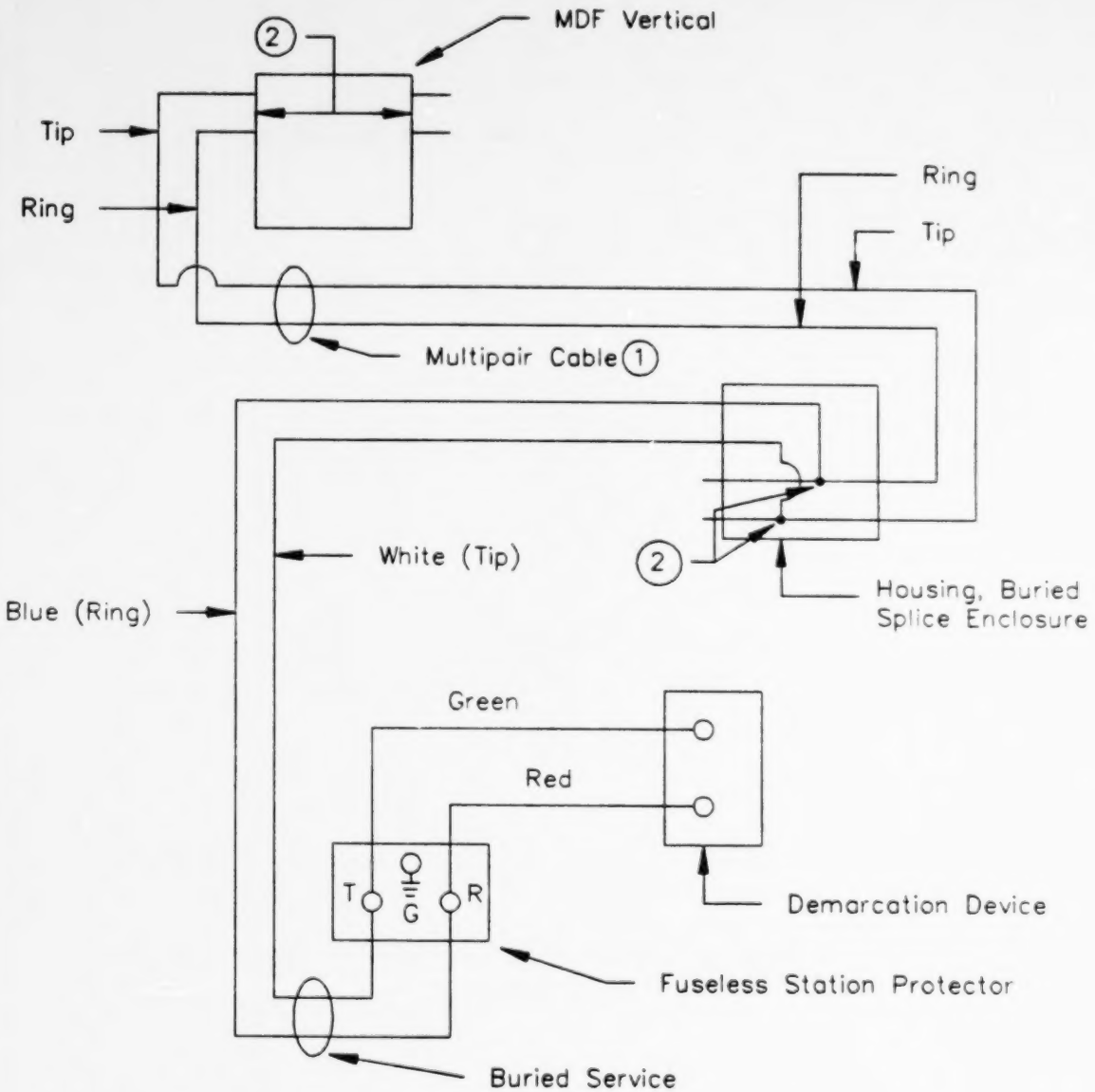
		BM80	BM81	BM82
ITEM	MATERIAL	No. req'd	No. req'd	No. req'd
sg	Guard, riser 1"ID*8'	1		
sg	Guard, riser 2"ID*8'		1	
sg	Guard, riser 3"ID*8'			1
*pn	Strap, riser, guard	2	2	2
*j	Screw, lag (size as required)	4	4	4

RURAL TELEPHONE CONSTRUCTION PRACTICES
RISER GUARDS

Scale: NTS

January 1988

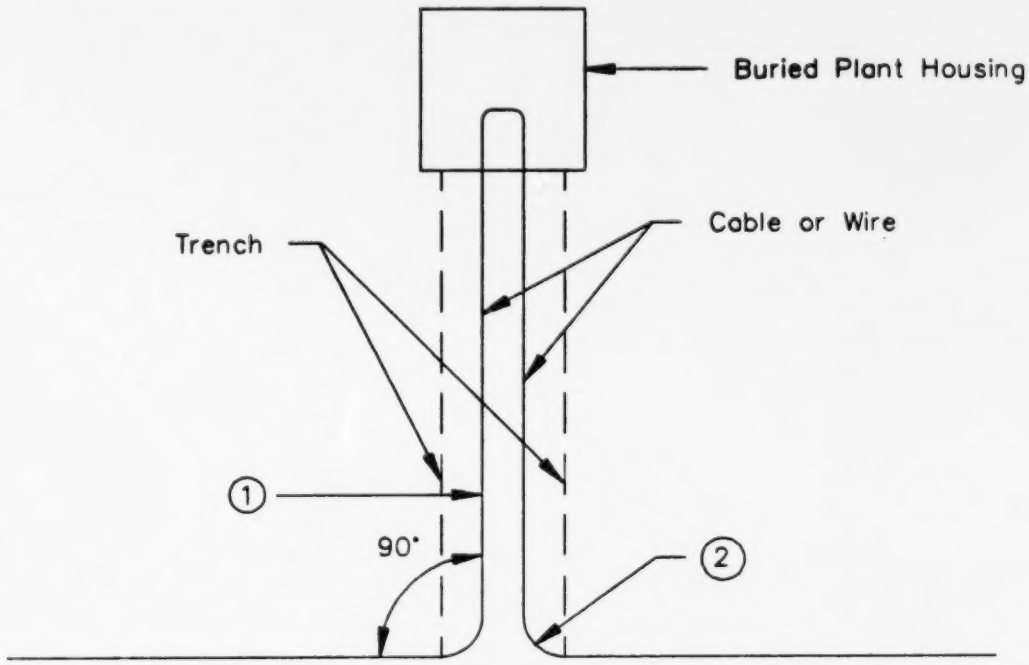
BM80, 81, 82



Notes:

1. Refer to appropriate cable specifications for tip and ring conductor identification.
2. Connections to be made in accordance with the manufacturer's instructions.

	RURAL TELEPHONE CONSTRUCTION PRACTICES BURIED PLANT CONDUCTOR POLARITY DIAGRAM		
	Scale: NTS		January 1988
			815-1

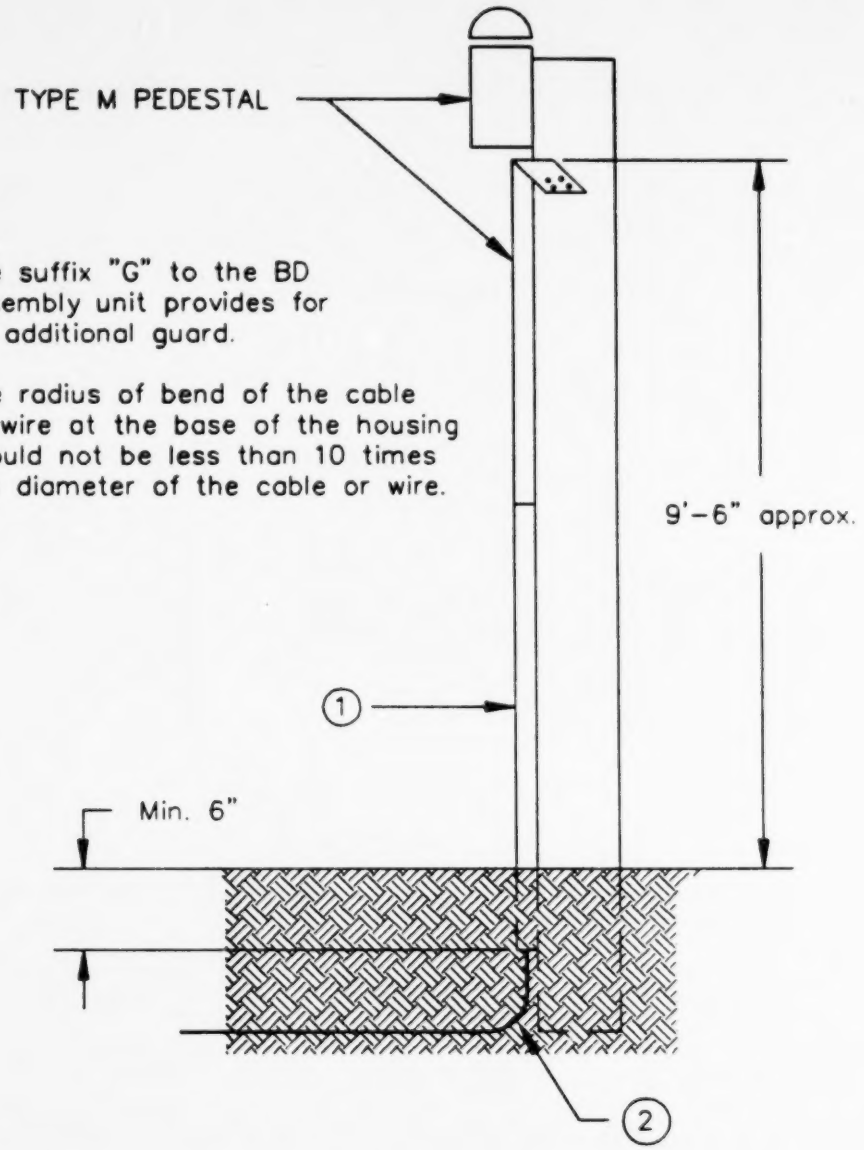


Notes:

1. The in and out laterals to the buried plant housings shall be located in the same trench.

2. The radius of bend of the cable or wire shall not be less than 10 times the diameter of the cable or wire.

	RURAL TELEPHONE CONSTRUCTION PRACTICES LATERAL RUNS TO BURIED PLANT HOUSINGS		
	Scale: NTS		September 1982
			902-A

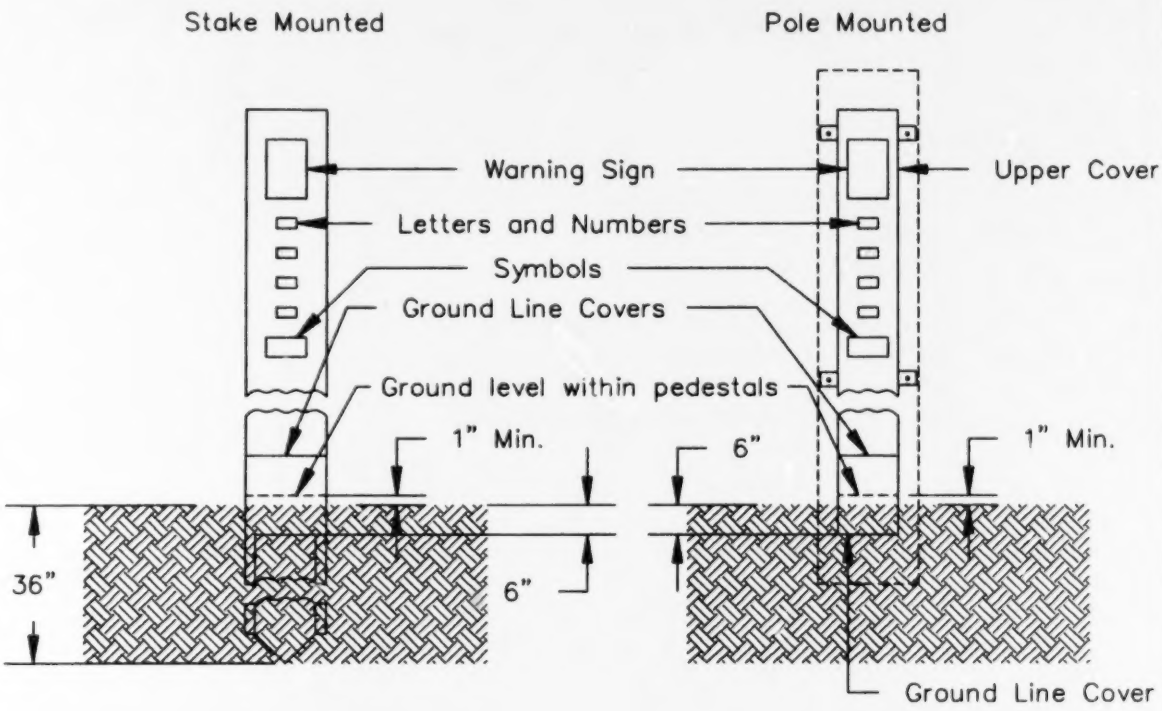


Notes:

1. The suffix "G" to the BD assembly unit provides for an additional guard.

2. The radius of bend of the cable or wire at the base of the housing should not be less than 10 times the diameter of the cable or wire.

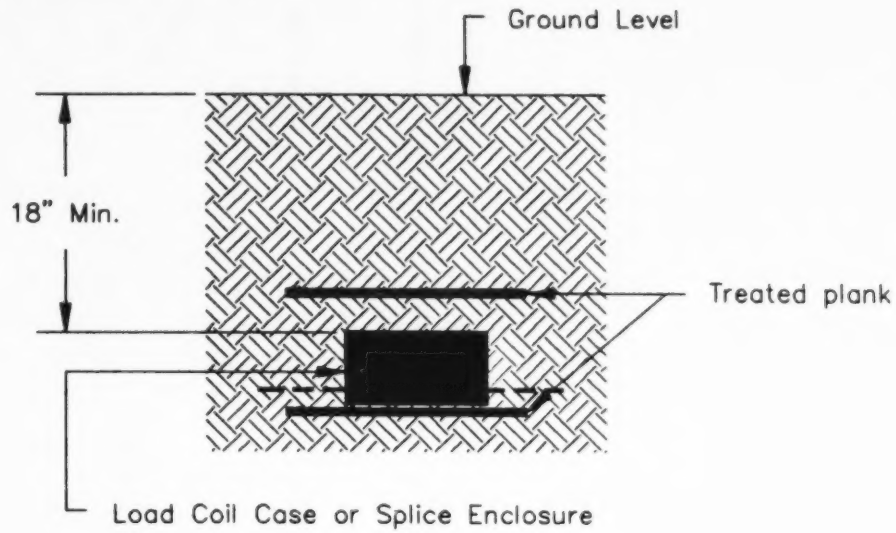
	RURAL TELEPHONE CONSTRUCTION PRACTICES INSTALLATION OF TYPE M POLE–MOUNTED PEDESTAL AT INCREASED HEIGHT		
	Scale: NTS		September 1982
			905



Notes:

1. For placement of warning signs, letters, numbers and symbols. See Guide Drawing 965.
2. Refer to REA Splicing Standard PC–2 for details of bonding the cable and wire shields and applying the direction markings.
3. For pole mounted unit the numbers may be installed on the pole if specified by the Engineer.
4. Pole mounting brackets will be installed in accordance with the manufacturer's instructions. Mounting lag screws will be furnished by the pedestal manufacturer.
5. Refer to Guide Drawing 905 for details on mounting Type M Pedestal at increased height.

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPE "H" AND TYPE "M" PEDESTALS POLE AND STAKED MOUNTED		
	Scale: NTS		September 1982
			906



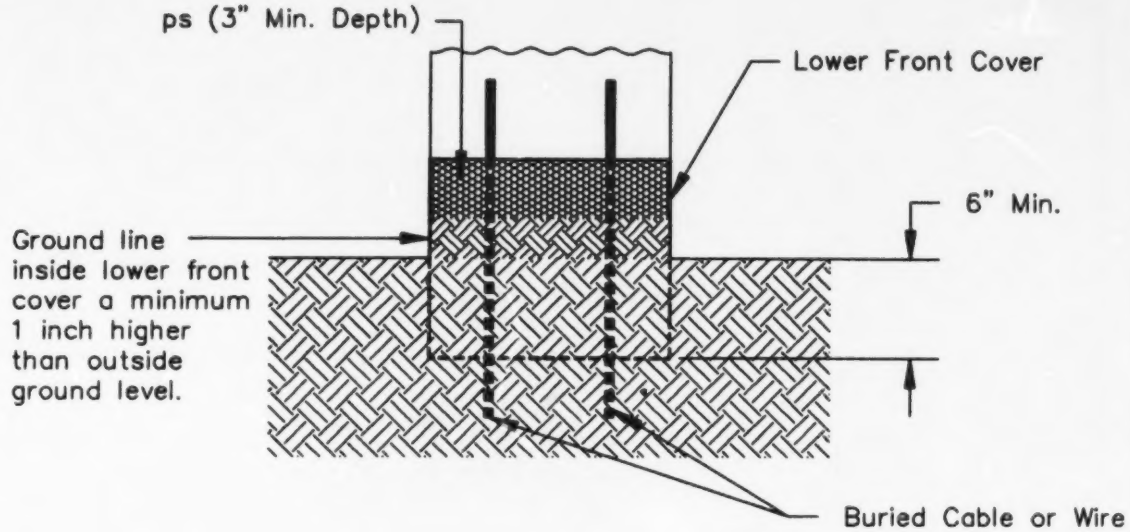
Notes:

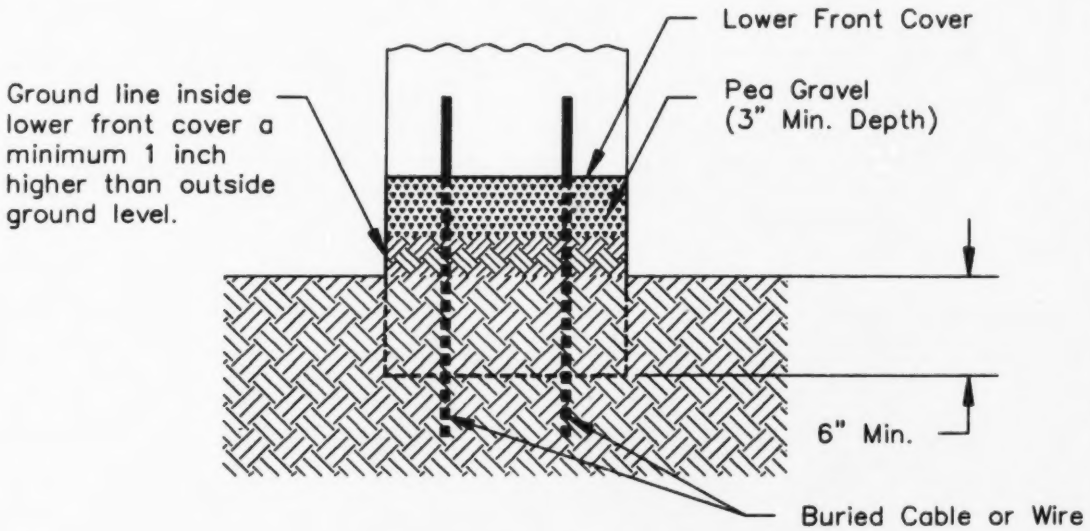
1. Fill the trench with soil to 6 inches above top surface of load coil case or buried splice enclosure and compact soil carefully. Place treated plank over top of installed case as shown. Compact trench fill carefully.

2. Where a firm base cannot be obtained, place the load coil case or splice enclosure on a treated plank.

3. Optionally, the load coil case or splice enclosure may be placed vertically.

	RURAL TELEPHONE CONSTRUCTION PRACTICES LOAD COIL CASES AND SPLICE CLOSURES – DIRECT BURIAL		
	Scale: NTS		March 1985
			907

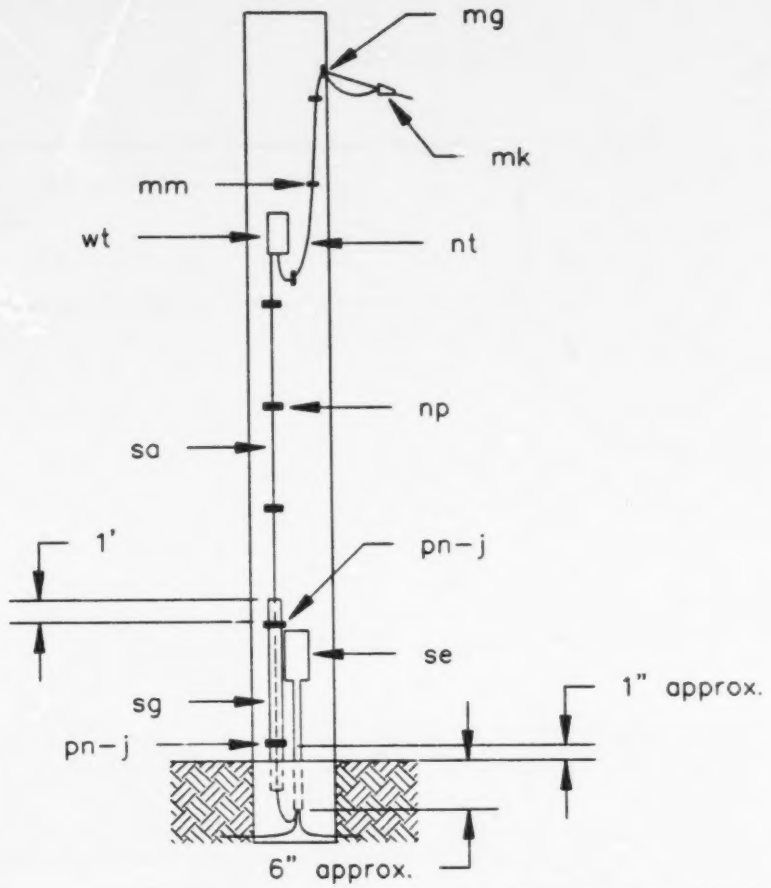

ps (3" Min. Depth)
Lower Front Cover
6" Min.
Ground line inside lower front cover a minimum 1 inch higher than outside ground level.
Buried Cable or Wire


Lower Front Cover
Pea Gravel (3" Min. Depth)
Ground line inside lower front cover a minimum 1 inch higher than outside ground level.
6" Min.
Buried Cable or Wire

ITEM	MATERIAL	NUMBER REQUIRED
ps	Sealer, housing	As required
–	Gravel, pea	As required

RURAL TELEPHONE CONSTRUCTION PRACTICES
RODENT PROTECTION FOR BURIED PLANT HOUSINGS

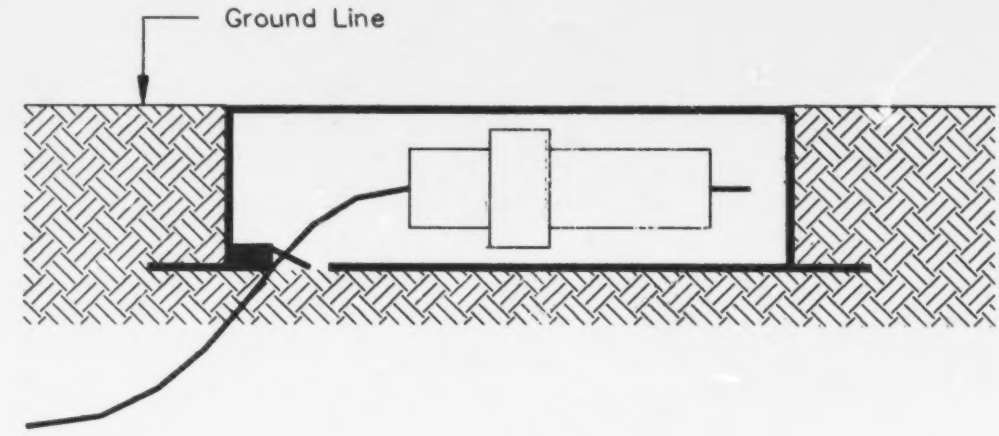
Scale: NTS		January 1988
		910

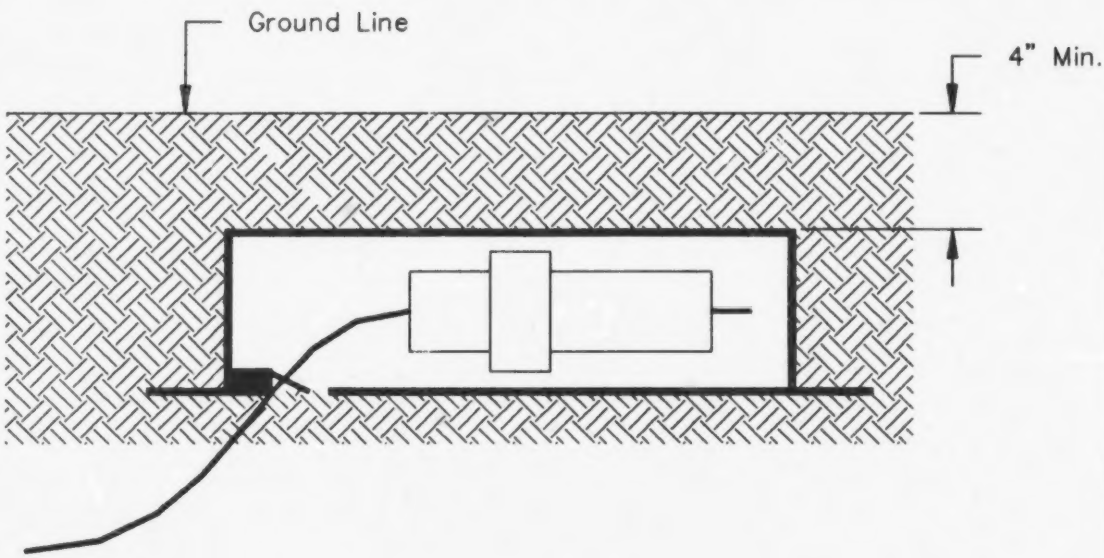


ITEM	MATERIALS	REQUIRED
wt	Terminal, wire, unprotected, pole–mounted, 1–pair	1
*pn	Strap, riser guard	2
*np	Clamp, cable (1–one hole, offset)	as req'd
sa	Wire, filled, buried service	as req'd
mk	Clamp, drop wire	1
nt	Wire, drop	as req'd
*mg	Hook, drive	as req'd
*mm	Ring, drive	as req'd
se	Housing, cable	1
sg	Guard, riser, 1"ID*8'	as req'd
*j	Screws, lag (size as required)	4

RURAL TELEPHONE CONSTRUCTION PRACTICES
AERIAL DROP WIRE TO BURIED PLANT

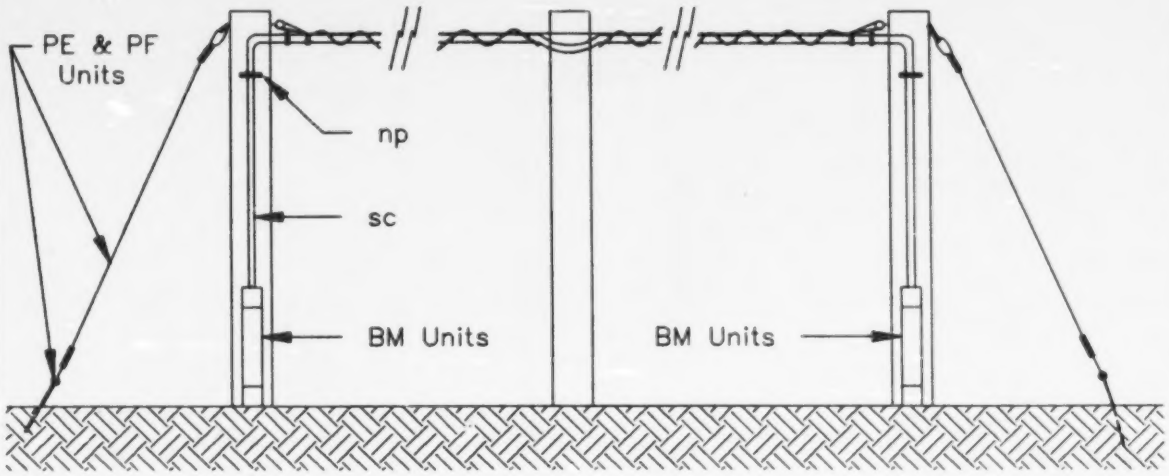
Scale: NTS		January 1988
		912





Note: The installation of the handhole, cable and splice enclosure shall be in accordance with the manufacturer's instructions.

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL HANDHOLE INSTALLATIONS		
	Scale: NTS		November 1977
			943

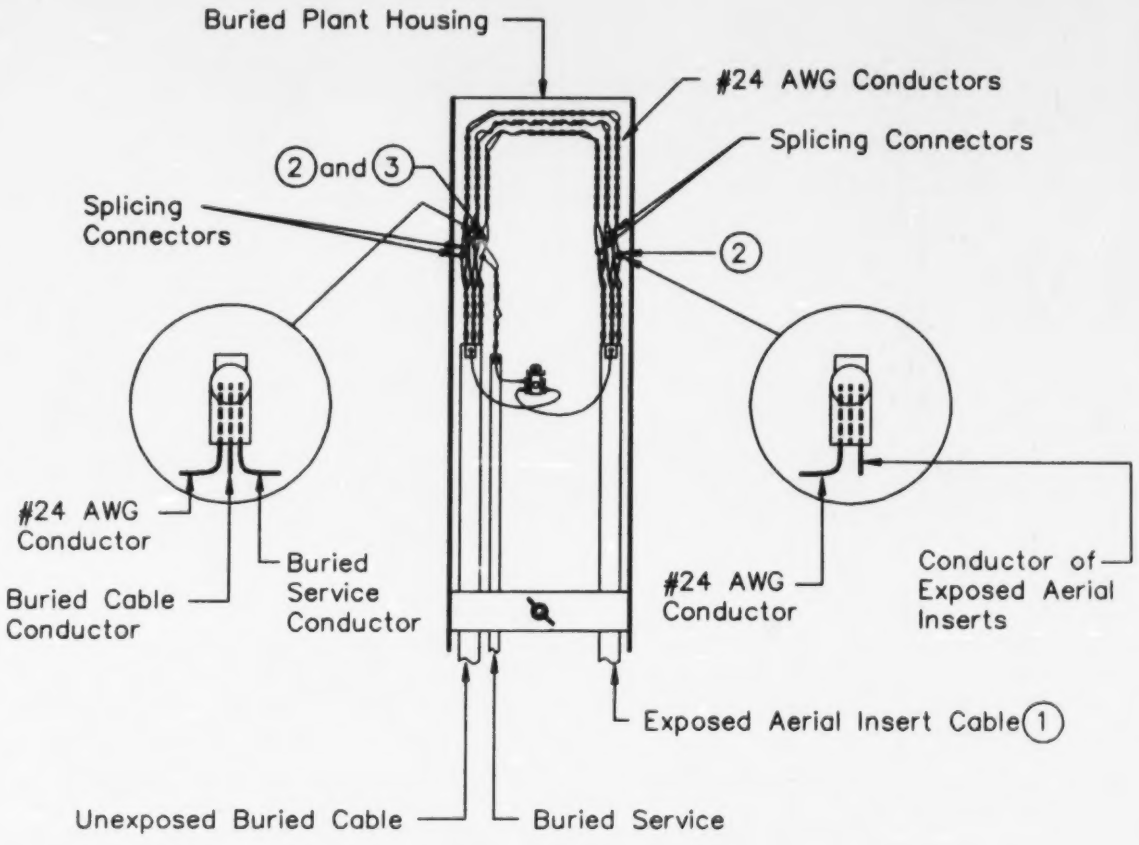


Notes:

1. The aerial construction used in this case shall be in accordance with the aerial construction practices described in REA Form 515f entitled, "Specifications and Drawings for Construction of Pole Lines and Aerial Cables".
2. The cable clamps shall be installed at approximately 18–inch intervals.
3. If it is necessary to cut the cable in making an aerial installation, the use of a ready–access enclosure or filled splice enclosure is acceptable.
4. Aerial inserts exposed to power contacts requiring special splicing will be identified by the Engineer and shall be isolated as shown on Guide Drawing 952.
5. Ground support strand where exposed to power contacts as specified by the Engineer on the Construction Sheets.

ITEM	NO. REQ'D	MATERIAL
*np	as req'd	Clamps, cable
pl	if req'd	Enclosure, filled splice
sc		Cable, filled buried
er	if req'd	Enclosure, ready–access

	RURAL TELEPHONE CONSTRUCTION PRACTICES AERIAL INSERT IN BURIED PLANT CONSTRUCTION	
	Scale: NTS	January 1988
		951



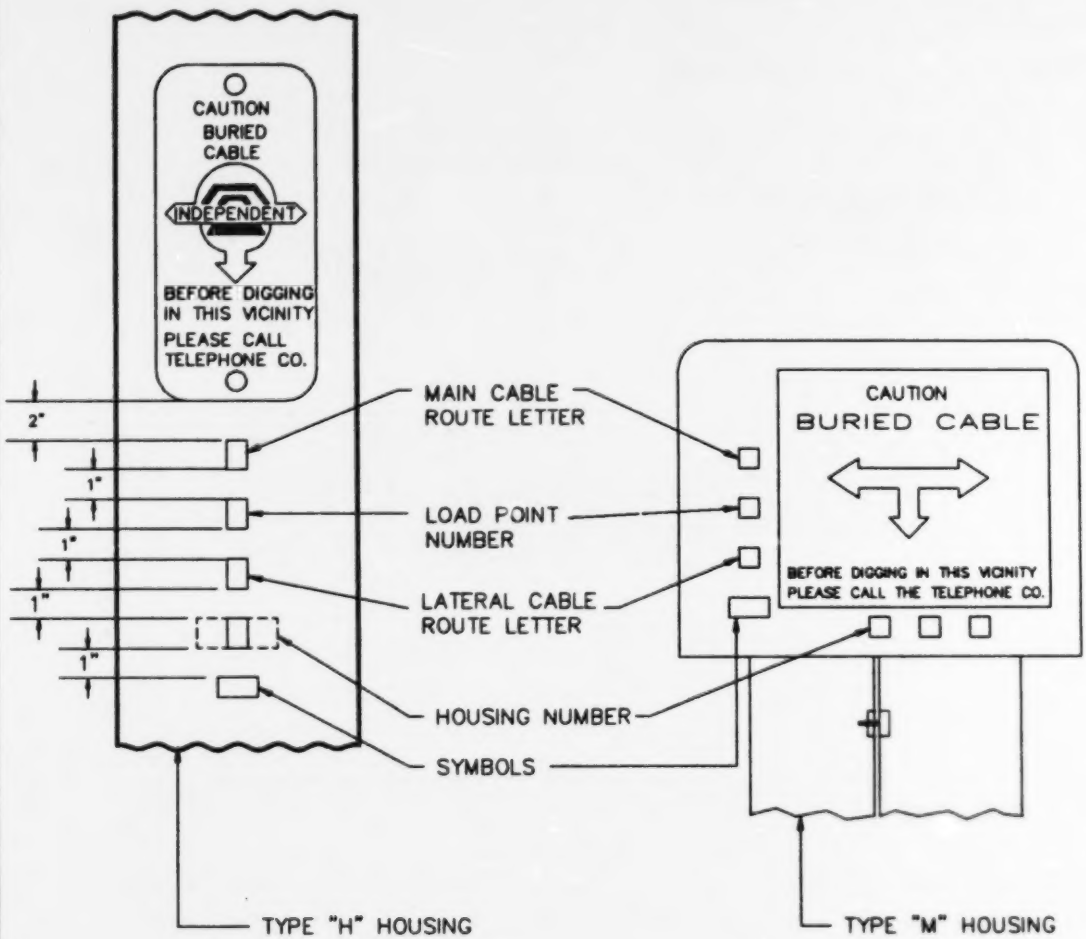
Notes:

(1.) Drawing 952 is applicable if the exposed aerial cable insert is #22 AWG or larger.

(2.) Splice a color coded #24 AWG Conductor (8 inches minimum length) in series with each cable conductor appearing in the aerial insert.

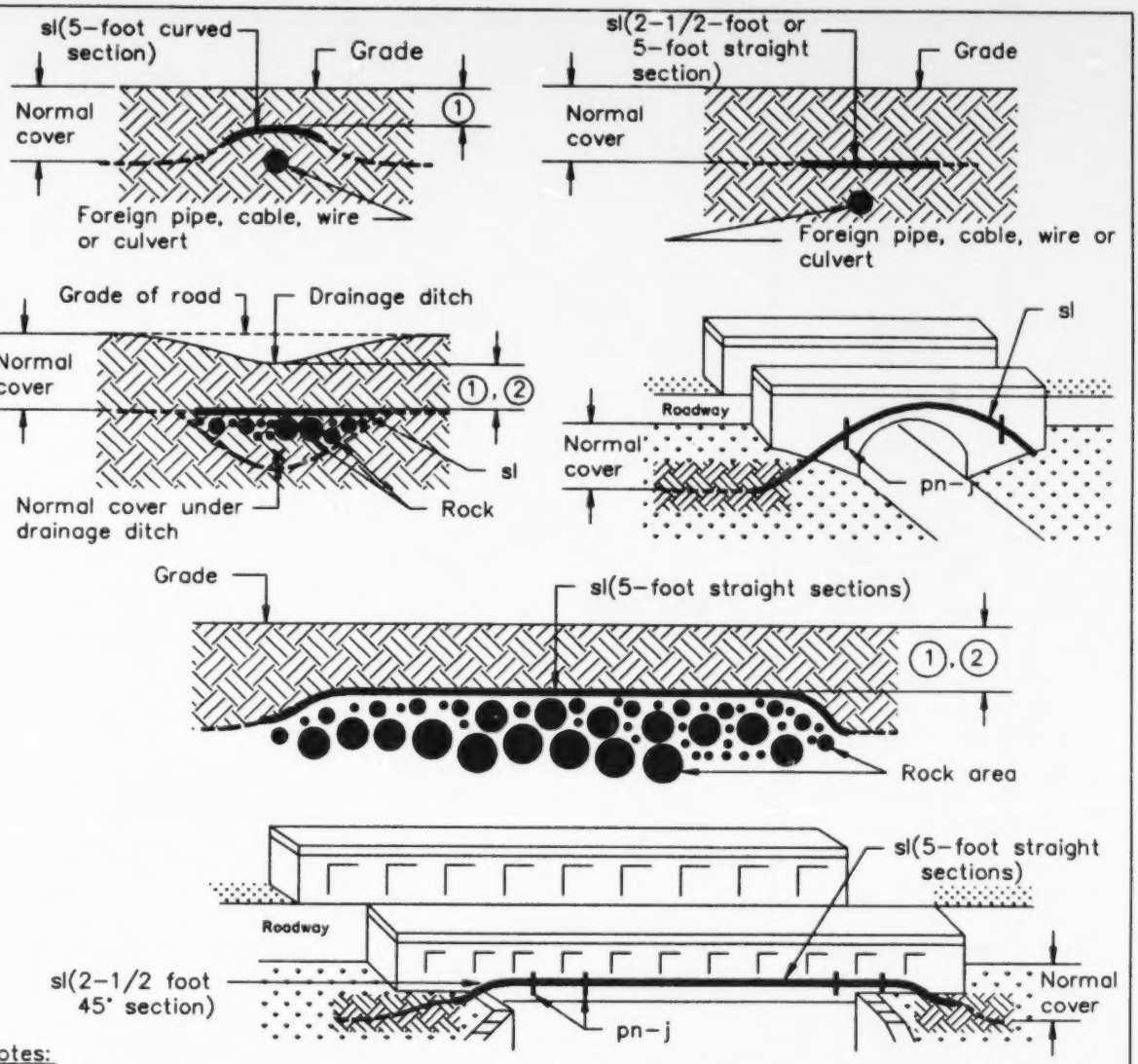
(3.) Splice the buried service, if any, to the unexposed buried cable at the same point that the #24 gauge lead is spliced.

	RURAL TELEPHONE CONSTRUCTION PRACTICES PROTECTION OF BURIED CABLE FROM POWER CONTACT TO AERIAL INSERTS		
	Scale: NTS		January 1988
			952



Note: Field installed warning signs or numbering systems should not penetrate or harm the pedestal surface.

	RURAL TELEPHONE CONSTRUCTION PRACTICES PLACEMENT OF NUMBERS AND LETTERS ON HOUSINGS		
	Scale: NTS		September 1982
			965



Notes:

① To be used when normal cover cannot be obtained due to rock or other obstructions.

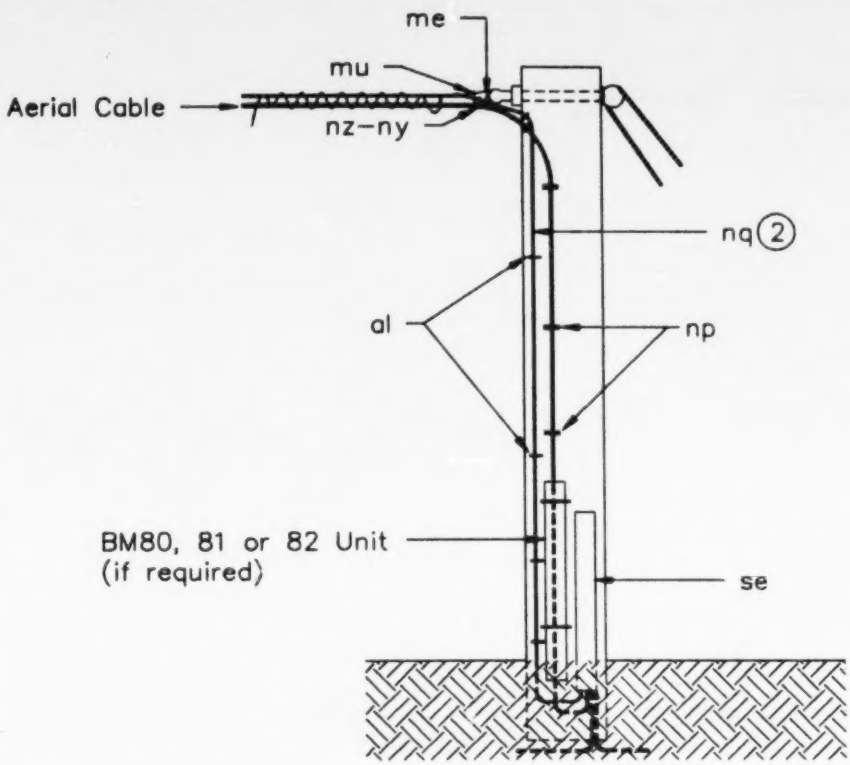
② The Engineer will specify the minimum depth under the surface that the guard must be placed for each particular application.

ITEM	MATERIAL
sl	Guard, split, 2-1/2-foot or 5-foot straight sections
sl	Guard, split, 2-1/2-foot or 5-foot curved sections
*pn	Straps, riser, guard (for 1-inch or 3-inch split guard assemblies)
*j	Screws, lag (size as required)
*ph	Anchor, screw, expansion (if required)

RURAL TELEPHONE CONSTRUCTION PRACTICES
APPLICATION OF GUARD ASSEMBLY

Scale: NTS | January 1988

969



Notes:

(1.) If the aerial conductors are smaller than 22 gauge, splice each aerial cable conductor, to be connected, directly to the main buried cable or wire conductor. If the aerial conductors are 22 gauge or larger, splice each aerial conductor to an 8–inch long 24 gauge insulated copper conductor of the same color as the conductor to be spliced. Splice other end of the 24 gauge conductor to the buried cable or wire conductor of the main lead.

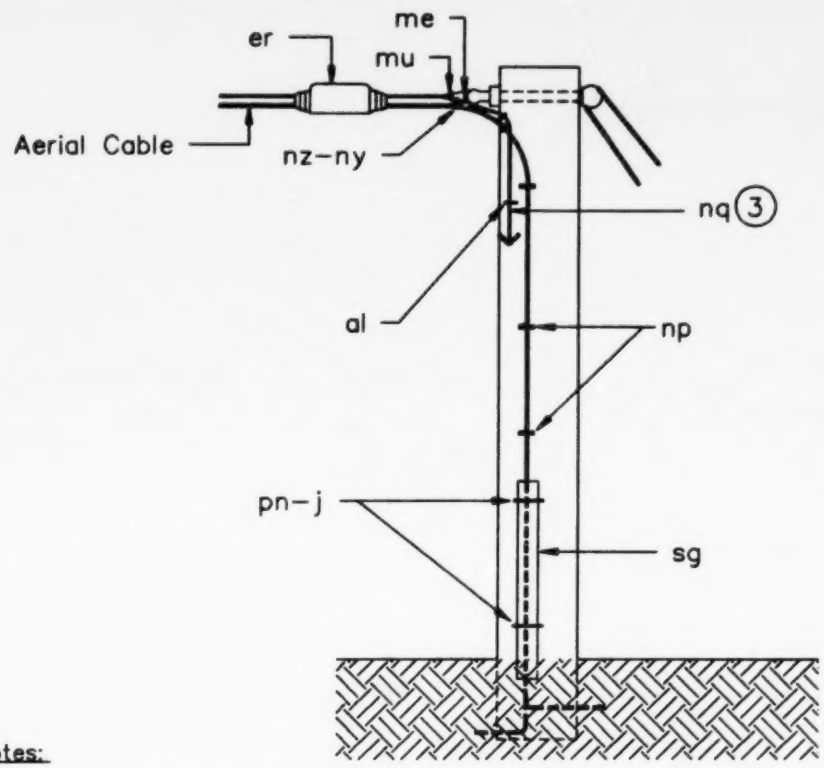
(2.) Connect the support strand of the cable to the grounding connector in the housing, by means of a #10 AWG ground wire and ground as specified by the Engineer.

(3.) Bond shield of aerial cable to bonding bracket in the housing.

ITEM	MATERIAL	ITEM	MATERIAL
*nq	Wire, ground, insulated #10	*np	Clamp, one–hole, offset
	AWG tinned copper	*mu	Sleeve, deadend, automatic
*al	Staples, ground, wire	*nz	Supports, lashed cable
me	Connector, grounding	*ny	Spacer, cable
se	Housing		

RURAL TELEPHONE CONSTRUCTION PRACTICES
WIRING ARRANGEMENT AT JUNCTION OF NEW AERIAL CABLE WITH BURIED CABLE OR WIRE

Scale: NTS		January 1988
		971–1



Notes:

(1.) If the aerial conductors are smaller than 22 gauge, splice each aerial cable conductor, to be connected, directly to the main buried cable or wire conductor. If the aerial conductors are 22 gauge or larger, splice each aerial conductor to an 8–inch long 24 gauge insulated copper conductor of the same color as the conductor to be spliced. Splice other end of the 24 gauge conductor to the proper buried cable or wire conductor of the main lead.

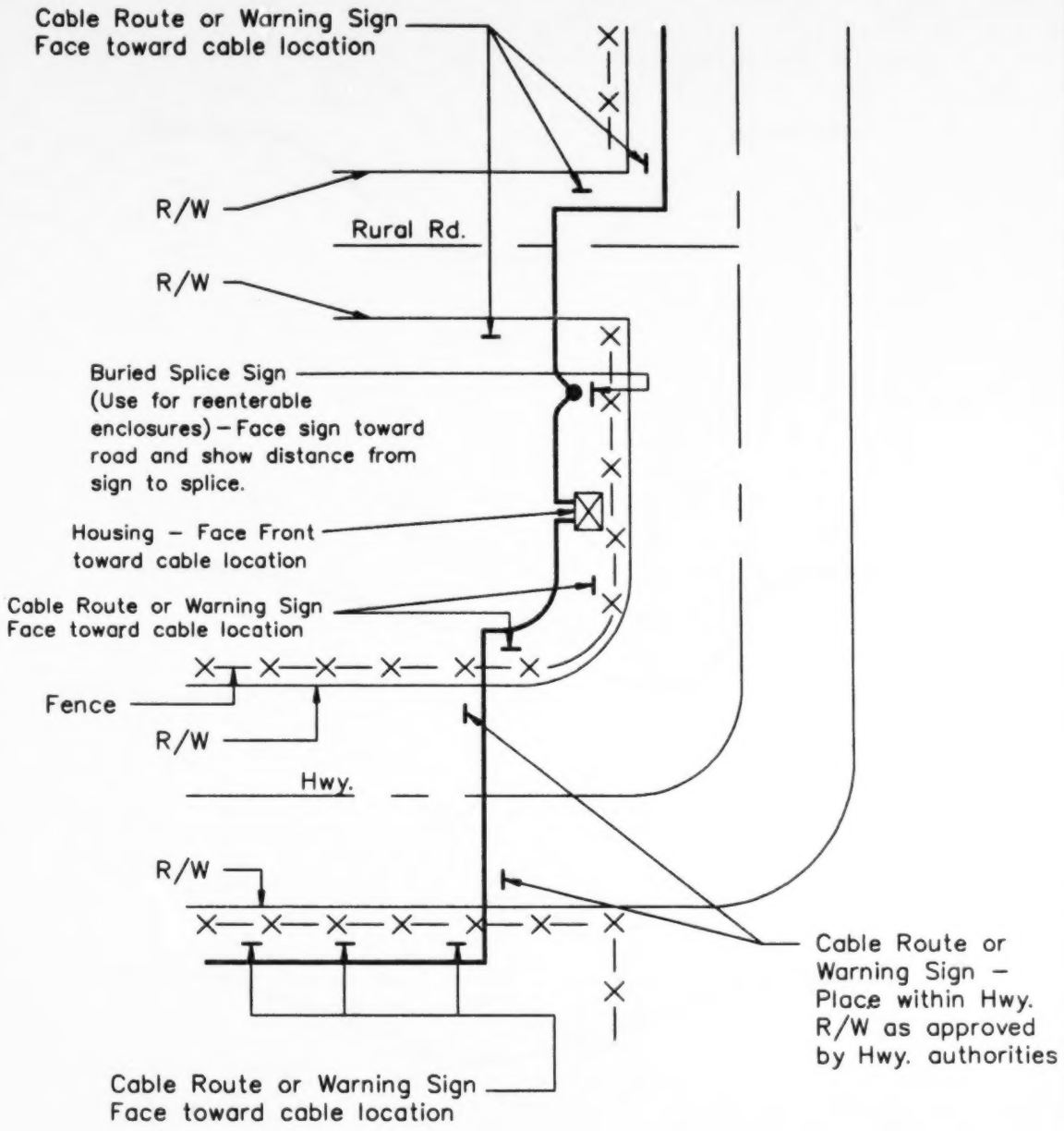
(2.) If necessary, remove insulation from under one clamp on support strand to obtain electrical bond between frame of ready–access enclosure and support strand.

(3.) If specified by the Engineer, install a #10 AWG insulated ground wire and connect to grounding electrode from the support deadend sleeve to a ground electrode.

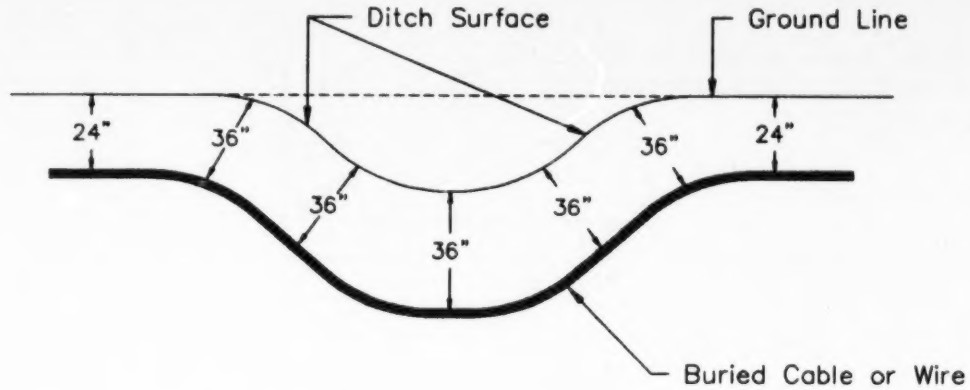
ITEM	MATERIAL	ITEM	MATERIAL
*nq	Wire, ground, insulated #10	*np	Clamp, one–hole, offset
	AWG tinned copper	*mu	Sleeve, deadend, automatic
*al	Staples, ground, wire	*nz	Supports, lashed cable
me	Connector, grounding	*ny	Spacer, cable
er	Enclosure, ready–access, cable	sg	Guard, riser
*pn	Strap, riser, guard	*j	Screw, lag

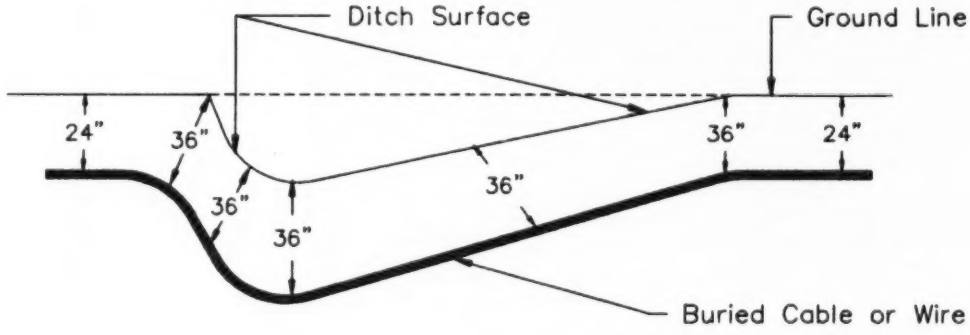
RURAL TELEPHONE CONSTRUCTION PRACTICES
JUNCTION OF AERIAL CABLE WITH BURIED CABLE OR WIRE

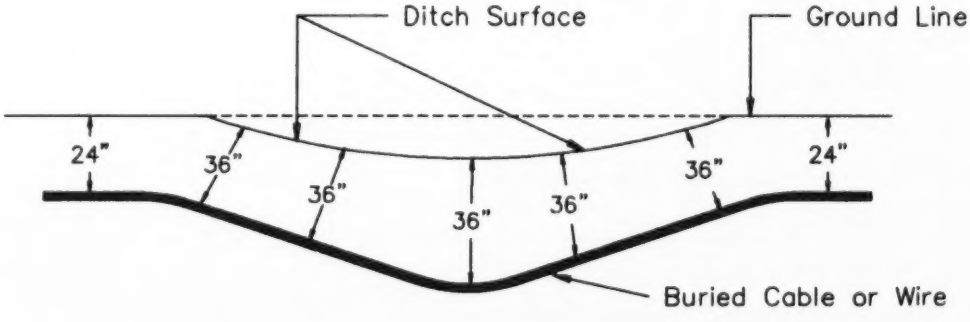
Scale: NTS		January 1988
		971–2


Cable Route or Warning Sign
Face toward cable location
R/W
Rural Rd.
R/W
Buried Splice Sign
(Use for reenterable enclosures) – Face sign toward road and show distance from sign to splice.
Housing – Face Front toward cable location
Cable Route or Warning Sign
Face toward cable location
Fence
R/W
Hwy.
R/W
Cable Route or Warning Sign – Place within Hwy. R/W as approved by Hwy. authorities
Cable Route or Warning Sign
Face toward cable location

	RURAL TELEPHONE CONSTRUCTION PRACTICES FACING OF CABLE HOUSINGS AND SIGNS		
	Scale: NTS		November 1977
			972

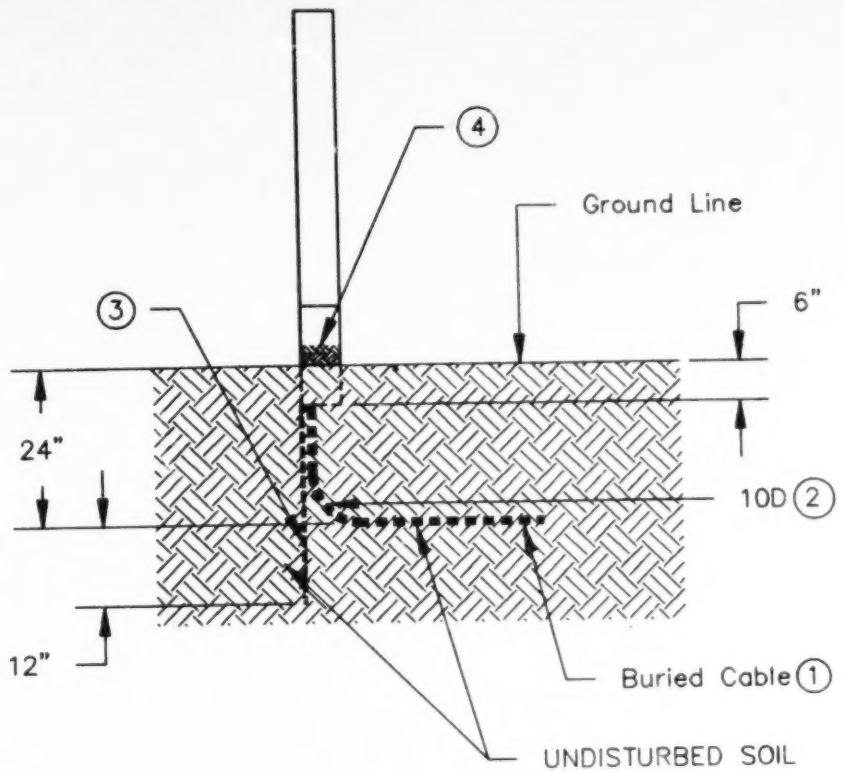






Note: Buried cable, wire, or services shall be placed as shown above. The 36-inch depth shall apply only at locations where the buried plant crosses the ditch, and shall not apply to buried plant installed parallel to and adjacent to the ditch.

	RURAL TELEPHONE CONSTRUCTION PRACTICES BURIED PLANT UNDER DITCHES		
	Scale: NTS		January 1985
			975



Notes:

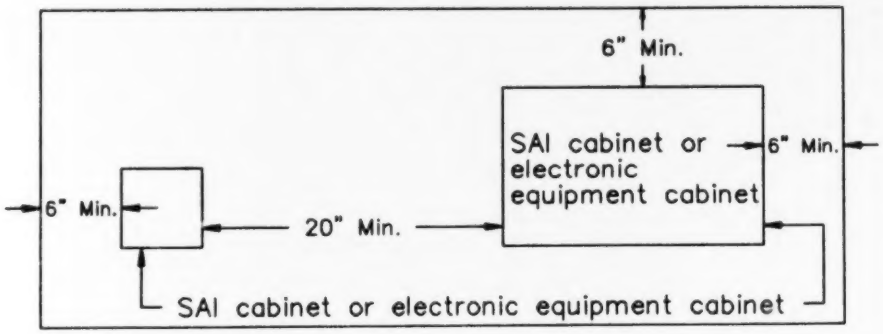
1. Place cable on undisturbed soil at bottom of trench.

2. The radius of bend of the cable at the base of the housing should not be less than 10 times the diameter of the cable and wire.

3. The stake of the housing shall be driven into undisturbed soil to a depth of approximately 12 inches.

4. The ground level inside the ground line cover plate should not be less than 1-inch above the outside ground level.

	RURAL TELEPHONE CONSTRUCTION PRACTICES HOUSING INSTALLATION DETAILS		
	Scale: NTS		January 1988
			976

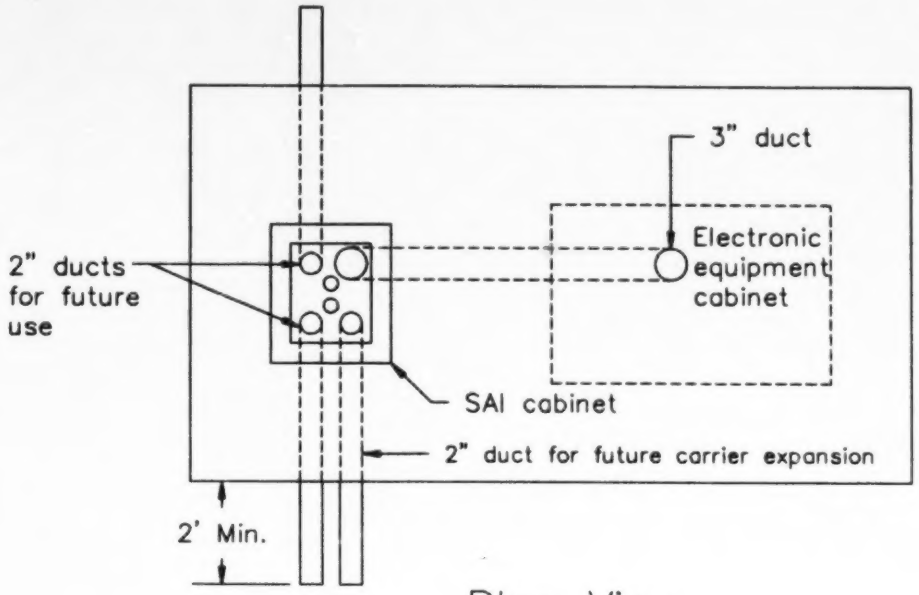


Notes:

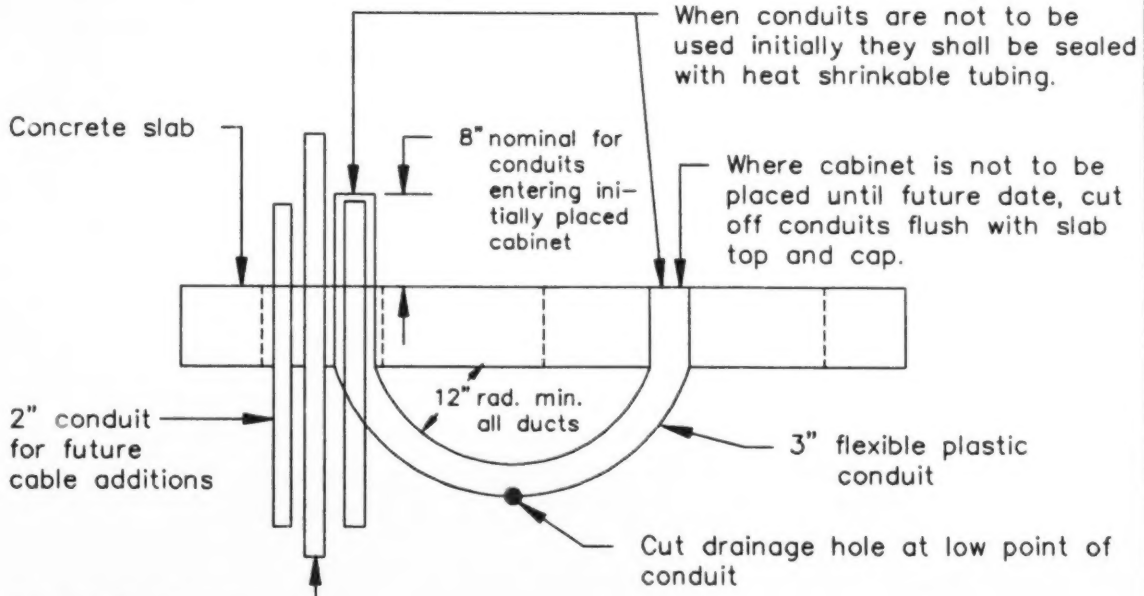
1. Specific instructions for the preparation and construction of the slab will be provided by the SAI and electronic cabinet manufacturer and/or the Engineer.

2. Where housings may be susceptible to vehicular damage, place pole stubs or posts at positions outside of the slab area as shown on Guide Drawing 1004.

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL CONCRETE SLAB – PLAN VIEW FOR SAI AND ELECTRONIC EQUIPMENT CABINET		
	Scale: NTS		January 1985
			1001

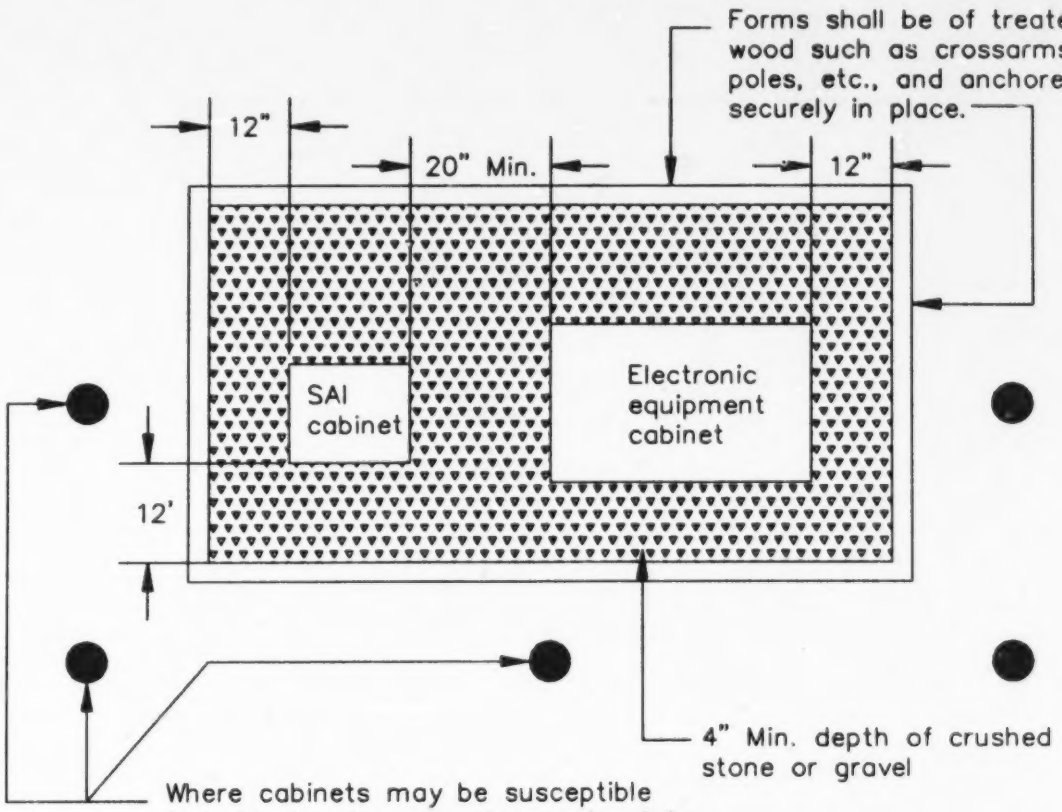


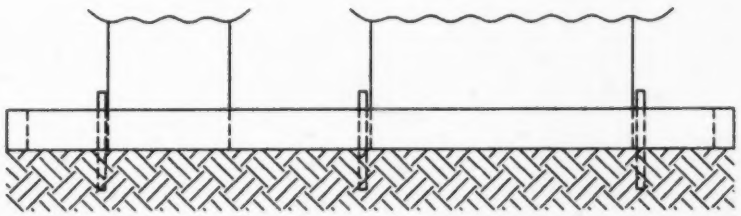
Plan View


When conduits are not to be used initially they shall be sealed with heat shrinkable tubing.
Concrete slab
8" nominal for conduits entering initially placed cabinet
Where cabinet is not to be placed until future date, cut off conduits flush with slab top and cap.
12" rad. min. all ducts
2" conduit for future cable additions
3" flexible plastic conduit
Cut drainage hole at low point of conduit
Feeder/distribution cable location

Side View

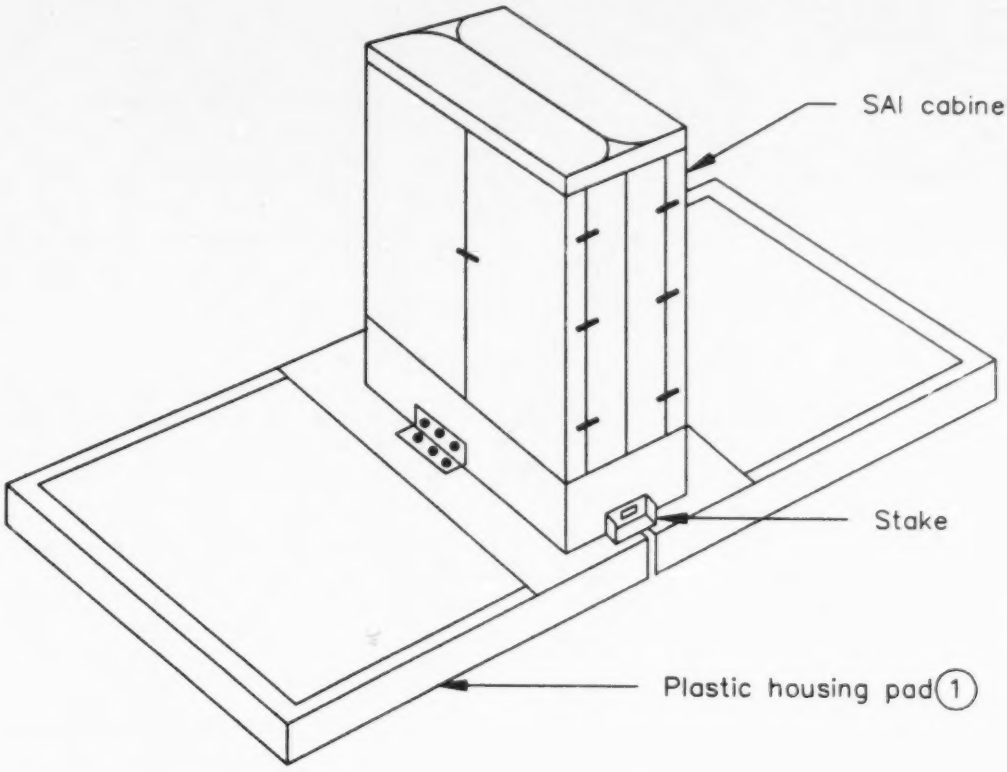
	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL CONDUIT AND CABLE INSTALLATION IN SLAB BASE FOR SAI CABINET		
	Scale: NTS		January 1985
			1003


Forms shall be of treated wood such as crossarms, poles, etc., and anchored securely in place.
12"
20" Min.
12"
SAI cabinet
Electronic equipment cabinet
12'
4" Min. depth of crushed stone or gravel
Where cabinets may be susceptible to vehicular damage, place pole stubs or posts as required. A reflective warning material shall be placed near the top of the post or stub pole as specified by the Engineer.



Note: Cabinets are to be mounted prior to placement of crushed stone or gravel.

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL CRUSHED STONE OR GRAVEL TYPE PAD FOR SAI CABINET		
	Scale: NTS		March 1985
			1004

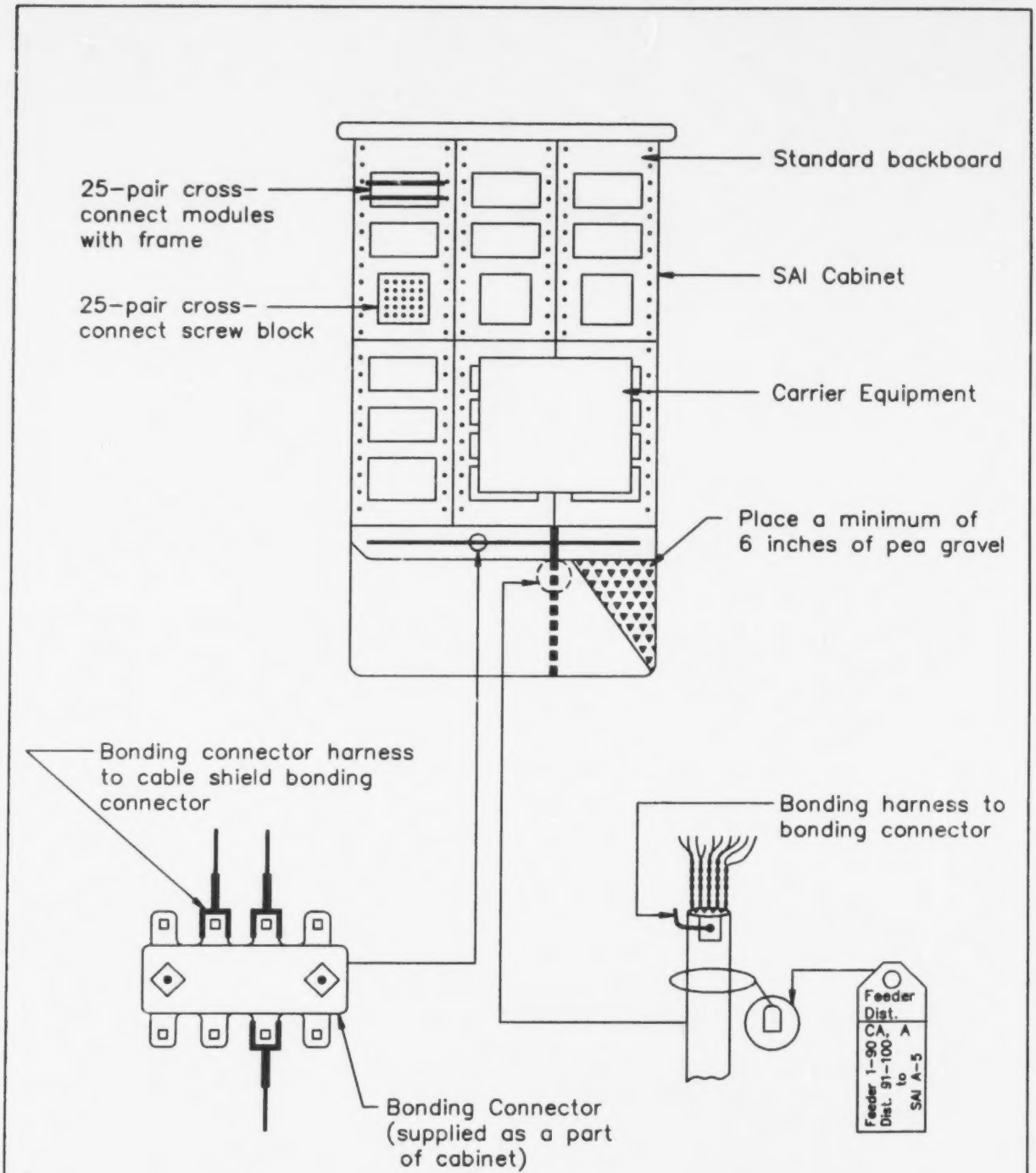


Notes:

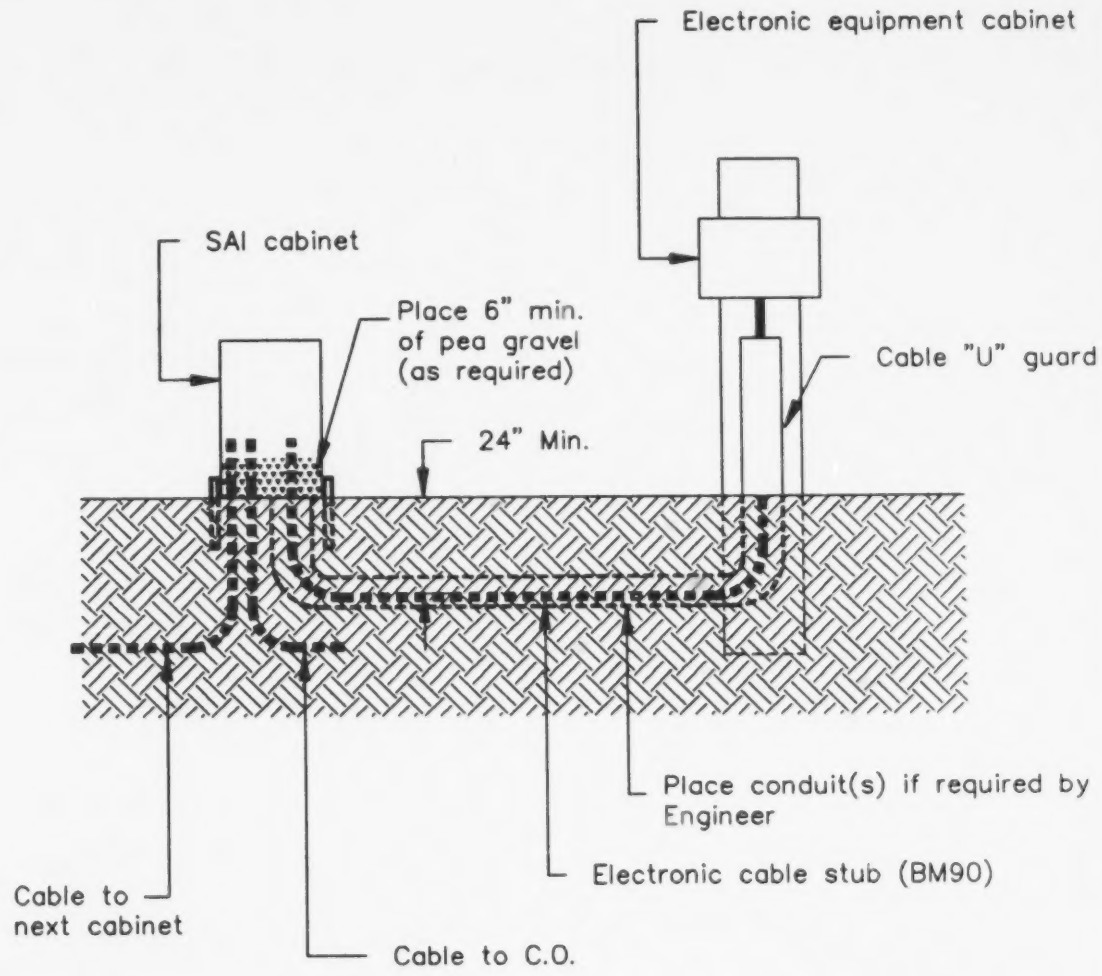
(1.) Pads are available from SAI cabinet manufacturer.

(2.) Where cabinets are susceptible to vehicular damage, place pole stubs or posts at positions outside of the pad areas as shown on Guide Drawing 1004.

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL PLASTIC PAD FOR SAI CABINETS		
	Scale: NTS		January 1985
			1005

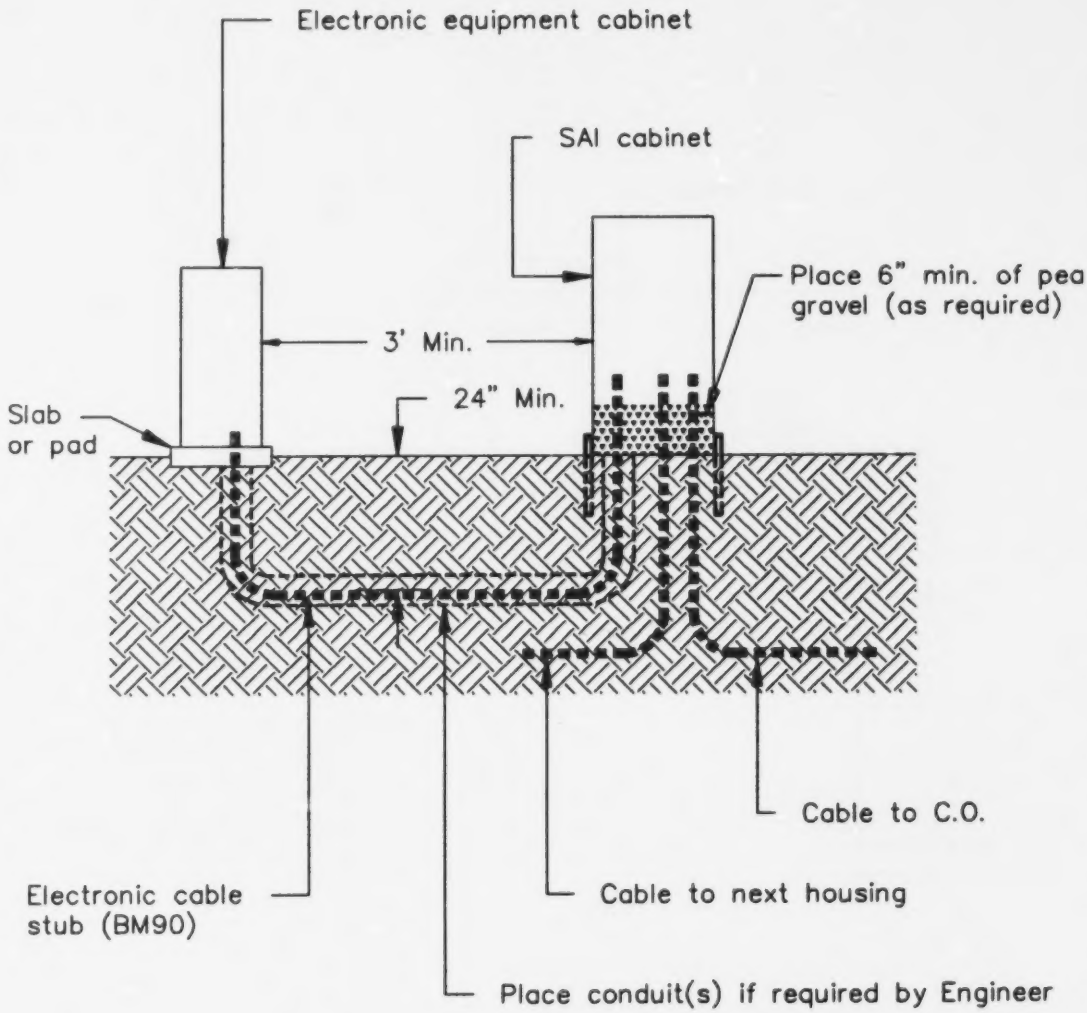


	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL SAI CABINET–MISCELLANEOUS DETAILS		
	Scale: NTS		March 1985
			1009



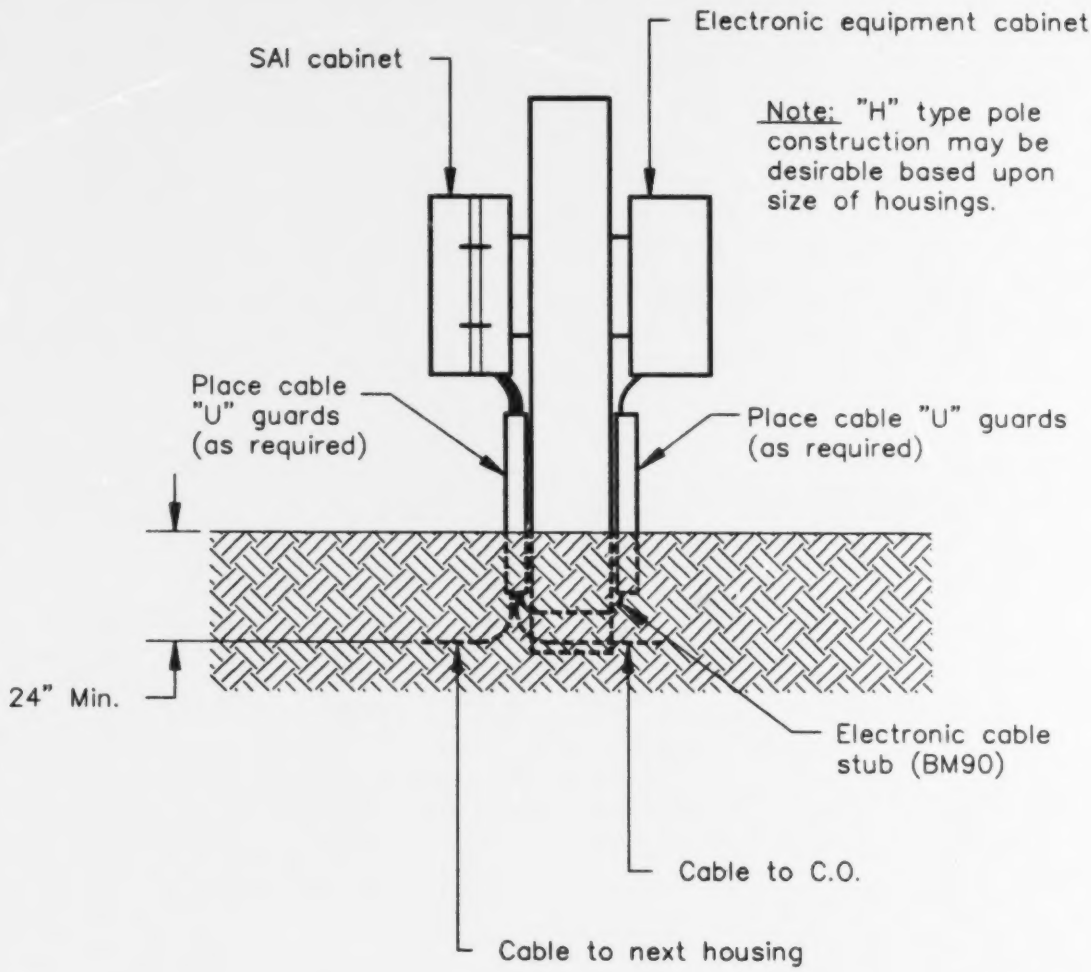
RURAL TELEPHONE CONSTRUCTION PRACTICES
TYPICAL INSTALLATION OF A SAI CABINET
WITH ELECTRONIC CABLE STUB TO POLE
MOUNTED ELECTRONIC EQUIPMENT

Scale: NTS		January 1985
		1010



RURAL TELEPHONE CONSTRUCTION PRACTICES
TYPICAL INSTALLATION OF A STAKE MOUNTED SAI CABINET WITH ELECTRONIC CABLE STUB TO A SLAB OR PAD MOUNTED ELECTRONIC EQUIPMENT CABINET

Scale: NTS		January 1985
		1011


Electronic equipment cabinet
SAI cabinet
Note: "H" type pole construction may be desirable based upon size of housings.
Place cable "U" guards (as required)
Place cable "U" guards (as required)
24" Min.
Electronic cable stub (BM90)
Cable to C.O.
Cable to next housing

	RURAL TELEPHONE CONSTRUCTION PRACTICES TYPICAL INSTALLATION OF A POLE MOUNTED SAI CABINET WITH ELECTRONIC CABLE STUB TO A POLE MOUNTED ELECTRONIC EQUIPMENT CABINET		
	Scale: NTS		January 1985
			1012